

**WORLD METEOROLOGICAL ORGANIZATION**

**COMMISSION FOR INSTRUMENTS  
AND METHODS OF OBSERVATION**

**TASK TEAM ON REVISION OF THE INTERNATIONAL  
CLOUD ATLAS**

**Third Session**

**Pretoria, South Africa**

**21 to 25 September 2015**

**FINAL REPORT**



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Chairperson, Publications Board  
World Meteorological Organization (WMO)  
7 bis, avenue de la Paix  
P.O. Box No. 2300  
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0)22 730 84 03  
Fax: +41 (0)22 730 80 40  
E-mail: [Publications@wmo.int](mailto:Publications@wmo.int)

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## **GENERAL SUMMARY**

### **1. ORGANIZATION OF THE SESSION**

#### **1.1 Opening of the Session**

1.1.1 The Third Session of the CIMO Task Team on Revision of the International Cloud Atlas (TT-ICA-3) was opened at 09:30 hours on Monday, 21 September 2015, at the headquarters of the South African Weather Service, Pretoria, South Africa.

1.1.2 Isabelle Ruedi welcomed the participants on behalf of the Secretary General of WMO, and extended WMO's particular thanks to Dr Linda Makuleni, the Permanent Representative of South Africa with WMO, for kindly offering to host the meeting at the headquarters of the South African Weather Service (SAWS), and to Colleen Rae of SAWS for making the meeting arrangements. Dr Ruedi noted informed the session that Dr Cohn, Chair of TT-ICA, was unable to participate in the meeting and that the co-chair, Michael Bruhn would be able to participate only by teleconference for some sessions. She informed the session that Ms Eliane Thurig-Jenzer had kindly agreed to chair the session in their absence.

1.1.3 Dr Ruedi reminded the participants that the Seventeenth World Meteorological Congress (Cg-17) had endorsed the ICA project, and had also agreed to delegate to Executive Council (EC) authority for changes to ICA. She noted that the next session of EC would be held in June 2016, so if the revised text for the new ICA is completed early in 2016, it can be submitted to EC-69 for approval. She further advised that Cg-17 also decided that the theme of World Meteorological Day in March 2017 will be "Understanding Clouds", so the task team should aim to have the revised ICA ready for operational implementation before then. Hence these are the two key milestones for the work of the task team. Dr Ruedi expressed her thanks to the participants for their work to date and their attendance at the session, and extended her best wishes to them for a productive and enjoyable meeting.

1.1.4 Ms Thurig-Jenzer then welcomed the participants and thanked them, on behalf of Dr Cohn, for their hard work during the year since TT-ICA-2. She commended the development of the image submission website by the Hong Kong Observatory, and added her best wishes to the team for a successful third session.

#### **1.2 Adoption of the Agenda**

1.2.1 The session approved the proposed meeting agenda.

#### **1.3 Working Arrangements of the Session**

1.3.1 The session agreed on details concerning the organization of its work, including working hours.

1.3.2 The session was reminded that one of its tasks for the week was to judge the winning entry in the Cloud Appreciation Society's (CAS) asperitas image competition. Mr Pretor-Pinney had requested this to be done as early in the meeting as possible, so that he would have time to notify the winner before the annual conference of CAS the following Saturday. The session agreed to consider this agenda item on the first day, so that CAS could be informed of the result on the following day.

1.3.3 Ms Rae advised that the task team would need to reserve its Wednesday morning session for consideration of the high level functional specification of the ICA website, noting that at 11.30am on that day a presentation would be provided by Malcolm McLean, a local web design specialist, on what the team needs to include in the functional specification.

1.3.4 The list of participants at the session is provided at [Annex I](#).

## 2. REPORT OF THE CHAIR

2.1.1 Ms Thurig-Jenzer presented the report submitted by Dr Cohn on his behalf. The report summarized the work of the team since its previous session in Geneva in October 2014, focusing on more recent developments.

2.1.2 Since October 2014 TT-ICA has advanced its work on Work Plan Tasks 1 through 8. About 20 WebEx meetings were conducted to discuss and communicate within the task team. Progress and status of the tasks would be reported by task leads during the current session. TT-ICA had continued to benefit from invaluable efforts and large time commitments from all members. Ms Thurig-Jenzer passed on the thanks of Dr Cohn to all members of TT-ICA for their sustained dedication to this activity.

2.1.3 It was acknowledged that considerable progress had been made in all areas. Noteworthy accomplishments were:

- Creation of the web-based image (and video and metadata) submission portal. Building and testing this portal, which had been led by the Hong Kong Observatory (HKO) and guided by the task team, was a monumental effort and WMO is indebted to HKO for this contribution. A follow-on task that had recently been completed was the creation of a web-based environment for team members to evaluate submissions;
- Release of a letter to PRs opening the submission portal for entries (July 2015);
- The improved Cloud Identification Decision Aid had been finalized;
- The Glossary, a new feature of the revised ICA, had advanced to near completion. It will be finalized after modifications to the body text are completed;
- Details of recommended changes to the cloud classification scheme were finalized. These changes include one additional species, several added supplementary features (including the renowned 'asperitas'), an additional accessory cloud, and several special clouds. Cloud features associated with severe convective storms were given close attention through the advice of the NOAA National Severe Storms Laboratory;
- Good progress had been made on updating the language used in the text of Volume I;
- Detailed consideration had been given to the logical sequence of text flow in a web-based format;
- Initial consideration had been given to the full linkages of information in the revised ICA, recognizing that it will be used in varied settings and for a variety of purposes;
- Revision of the ICA was a topic discussed at WMO Congress Cg17 (see item 5 below). To increase the visibility of the project and to inform and gain support for it from WMO Members, a series of full size posters was displayed in the foyer during Cg17 and a side event was organized, which featured an excellent presentation by Mr. George Anderson (UKMO) on the need for an updated, web-based ICA.

2.1.4 A summary of the main ICA-related outcomes from Cg17 included:

- 2.5.10 Congress expressed its appreciation to all Members for the assistance of their experts during the last intersessional period ..... in preparatory work towards a new, primarily web-based edition of the International Cloud Atlas;
- 4.2.2.76 Congress was pleased that CIMO has taken steps in developing a new web-based edition of the International Cloud Atlas (ICA) – Manual on the Observation of Clouds and Other Meteors (WMO - No. 407, Volumes I and II) as a WIGOS-related document needed for the operation of NMHSs, particularly in developing countries. This activity will ensure that the ICA remains the world's authoritative, primary source of cloud classification, will be fully comprehensive and contain the most up-to-date information. Congress urged Members to make experts and resources available for this activity, and to consider developing and/or hosting the ICA web-based version. Congress acknowledged that the update of the International Cloud Atlas would need to be made by correspondence and

delegated EC to approve the Atlas and ensure its prompt publication. Congress voiced support to fund that activity under RB to the extent possible within available resources;

- Resolution 27: Instruments and Methods of Observation Programme: (IMOP)  
..... Requests the Secretary General to.....
  - (6) To provide needed support to update the International Cloud Atlas (WMO-No. 407), Volume I – Manual on the Observation of Clouds and Other Meteors, and Volume II, and to arrange for its publication.
- Resolution 28: Report of CIMO-16: .....  
Recommendation 3 (CIMO-16) – Revision of the International Cloud Atlas (WMO-No.407)
  - (a) Approves this recommendation;
  - (b) Recommends Members to support the development of the International Cloud Atlas through voluntary contributions to the CIMO Trust Fund and secondments;
  - (c) Recommends that other relevant technical commissions collaborate with CIMO, as appropriate;
  - (d) Recommends that the Secretary-General identify the necessary resources to complete the work.

2.1.5 Ms Thurig-Jenzer noted that the goals of the third session could be adjusted based on the needs of the group as the session progressed, but that she expected:

- An update by the task lead for each task on the current status of each activity, and development of common understanding of how to proceed with the Work Plan, schedule, and commitments going forward;
- Discussion and progress on the Volume I text, including any further modernization of language, update of scientific content, and/or changes to the organization (Task 4);
- Some progress on Image Selection, as time and submissions to date permit (Task 6);
- Progress toward a final specification of requirements for building the ICA website, suitable for interaction with a web-designer or implementation programmer (Task 8);
- Discussion of strategy and options for developing and hosting the ICA website;
- Judging of the finalists of the Cloud Appreciation Society's asperitas photo competition; and
- Update of the Work Plan based on a more thorough understanding of each of the planned tasks.

### **3. PROGRESS AGAINST TASKS**

#### **3.1 Report on Task 1: Work Plan and Schedule**

3.1.1 Dr Atkinson briefly reviewed the TT-ICA Work Plan on behalf of Dr Cohn and reiterated the two key milestones that the task team should endeavor to meet:

- EC-68 (June 2016): ICA text to be finalized 3 months before (end of March 2016).
- WMD 2017 (March 2017): web-based ICA published and operational by then (early March 2017).

3.1.2 Dr Atkinson noted that the task team had focused for much of the year on completion of the image submission website, at the expense of other key tasks such as revising the text and developing a functional specification for the eventual ICA website. In recent discussion, Dr Cohn had indicated that, now that the image submission website is operational, it is time for the team to turn the focus of its attention to these two important tasks and to image assessment and selection.

#### **3.2 Report on Task 2: Imagery Needs**

3.2.1 George Anderson summarised the work conducted by the Image Sub-Group since TT-ICA-2, on behalf of Michael Bruhn, who was unable to participate in person.

3.2.2 TT-ICA had previously agreed that there is a need to update all photographs for all existing classifications in the International Cloud Atlas by sourcing images from around the world. This would enable:

- Improvement of the quality of images in the Cloud Atlas by using modern digital, high resolution colour photographs;
- Replacement of all old reference images with modern examples taken in recent years to make the Cloud Atlas more up-to-date;
- Use of new photographs which show differences in varying geographic, climatic and topographic areas and seasonal variations.

3.2.3 Mr Anderson reminded the session that additional imagery is required to illustrate certain classifications in more detail than shown in the current Cloud Atlas, (e.g. - to better illustrate the variety of photometeors, and to illustrate the classification of noctilucent clouds). New images are needed to illustrate the proposed new cloud classifications and new images are required to illustrate the terms included in the Glossary. Taking advantage of publication of the revised Cloud Atlas in digital form, time-lapse and video imagery will be used, where appropriate, to show the development of clouds, or cloud features over time and imagery for this purpose will be required. Publication on the Internet will also allow the cost effective use of a greater number of images than in the current printed version. Altogether, it is anticipated that up to 1500 images will be required.

3.2.4 Mr Anderson also reminded the session that, in addition to photographs, time-lapse and video, it is intended to use supporting metadata images, such as synoptic charts, satellite images, radar images and thermodynamic diagrams to help illustrate the meteorological situation of some images. Photo contributors have been requested to provide as much metadata as possible. These images will be used only when appropriate and subject to WMO obtaining copyright approval. Mr Anderson noted that it is intended to retain the images contained in the current version of the ICA and display these as reference imagery, to enable preservation of traceability of the standard. Dr Atkinson noted that all images from the current ICA are now held at WMO in digital form, ready for insertion into the new ICA.

3.2.5 In closing, Mr Anderson reminded the session that candidate imagery is now being acquired through the ICA Photo Submission website at <http://wmoica.org/index.php/en/>

### **3.3 Report on Task 3: Glossary**

3.3.1 Ernest Lovell presented a brief report on progress with the Glossary. He reminded the session that TT-ICA had previously decided that only terms not already defined in the ICA should be defined in the Glossary, though Dr Ruedi suggested that other terms should be listed but not defined, and linked to their definition elsewhere in the text of the ICA. Mr Lovell noted that there are currently 161 terms defined in the Glossary. He reminded the session that the content had been all but finalized by the previous meeting, and that TT-ICA-2 had agreed that final completion of this item should be put on hold pending finalization of the text and image captions. Mr Lovell suggested that he would remain alert during the Text Sub-Group's revision of the text during the session, for any additional terms that should be included. At the end of the session, Mr Lovell provided a short list of these additional terms for inclusion in the Glossary ([Annex III](#)).

### **3.4 Report on Task 4: Text**

3.4.1 Ms Rae reminded the session that since the beginning of the year, the content of the ICA Volume 1 text pages had been worked through by the team and the proposed changes and or queries had been discussed together during the earlier Webex meetings. Since then, Volume 1 had been worked on to incorporate all the agreed upon changes and needed to be verified by the team during the current session.

3.4.2 It was noted that most of the changes made to Volume 1 to date had been quite minor and the session needed to consider whether this is all they intended to do, or whether more substantial updating should be pursued (e.g. potential structural changes, additional information/understanding that was not available when the present edition was written.) After some discussion the session agreed to the latter option: the text should be extensively updated, rather than simply modernizing the language. However, the team should endeavour to minimize changes to those parts of the text



comprising WMO Technical Regulations (those whose headings are in bold text), so that traceability can be preserved.

3.4.3 Ms Rae described how, in addition to updating the text, the sub-group had broken the content of Volume I down into structured segments to be used in the on-line version of the ICA. Tam Kwong Hung commended this work, explaining that Ms Rae's structural diagram is what is needed by the web design team to commence the web layout design.

3.4.4 With regard to the layout, there was some discussion of the desired appearance of the new ICA, in its various forms (web version, published hard copy version, computer print version, and version used for various other media (e-book, smart phone, tablet, etc). Should Volumes I and II be integrated in all media? It was agreed that the primary consideration should be the web version and that this should be integrated, as should a 'print from the web' version. Regarding the WMO published hard copy version (the coffee table book), the session was informed that WMO Publications area has already informally advised that this would contain Volume II only. Regarding the other electronic versions, Mr Tam advised the session that these should probably all stem from an adapted e-book version, which could then be quite simply displayed on smart phones, tablet etc. An undesirable alternative would be to have a different 'app' for each device, making maintenance much more challenging.

3.4.5 Ms Rae informed the session that Michael Bruhn had been independently examining the overall requirements for the text revision and has made a number of suggestions:

- Apart from modernizing the language used in Part I, there is a need to rephrase some sections to remove the 'narrative' mode employed (e.g. "the reader is reminded..."). The session agreed with this proposal. Mr Bruhn provided an example from the current text to illustrate his point:

*"Stratocumulus cumulogenitus most often results from the spreading out of Cumulus which, while in process of vertical development, reaches a stable layer. Sometimes, when this layer is very stable, the ascending currents are stopped and the whole cloud mass spreads out. On some occasions, the stable layer cannot stop the rising motion altogether; in this case, the Cumulus clouds, after a temporary spreading out, resume their growth above the stable layer, at least in some places. Thus, Stratocumulus cumulogenitus may occur at any level between the base and top of Cumulus clouds.*

*The observer should know how to distinguish real Stratocumulus cumulogenitus from Stratocumulus penetrated by Cumulus clouds. He should realize that the transformation of Cumulus clouds into Stratocumulus cumulogenitus is a continuous process, generally marked by gradual widening of the Cumulus clouds towards the spreading out level. In the case of a pre-existing Stratocumulus, entered or transpierced by a Cumulus, the latter does not widen upwards towards the Stratocumulus and a thinned or even a cleared zone may surround the Cumulus column."*

- Mr Bruhn has observed that in Parts I and II, not many sections require extensive updating, but that there is a lot in Part III that could benefit from additional information on current understanding, which is far advanced from where it was in the 1970s, e.g., lightning, photometers. An important point made in discussion of this matter was that the ICA is primarily for cloud observers, rather than cloud physicists, so it should focus on the appearance of clouds, rather than the physical processes occur in them. However, where the physics influences the appearance, or where the appearance provides an important indication of significant weather (e.g. 'beaver's tail'), inclusion of some physical explanation is warranted. But the team should avoid inclusion of 'leading-edge' science that is not yet mature, and should remain aware that the timeline is tight so a pragmatic approach is required and the overall focus should be on including information useful to cloud observers.
- Mr Bruhn has noted that the current version of the ICA commences with the definitions of meteors, then moves straight onto detailed consideration of clouds, with further consideration of other meteors only reappearing much later in Part III. He has suggested that the ICA should revert to its 1956 structure in this respect, and relocate the definitions of

meteors to Part III, where it was previously. He suggested that a new short introductory section should be added at the beginning, in place of the meteor definitions;

- The current ('old-fashioned') Table on p.15 could be replaced by an attractive illustration to convey the same information;
- Should Part II.5 be retained? At the initial steering group meeting in Geneva in 2011, the consensus was that the ICA should be targeted at the appearance of clouds etcetera from the surface, not from aircraft or from space, yet the team was concerned that pilots remain a significant target audience for the ICA so this section should be retained. Mr Anderson agreed to approach the RMS's special interest group in aviation meteorology to identify a willing candidate to update Part II.5, which if retained is in need of substantial revision;
- Mr Bruhn had also provided an input document for the meeting ([Annex II](#)) which identifies numerous other sections of text requiring attention, with suggested changes which the session agreed to take into account during its Text Group breakout sessions later in the week.

3.4.6 Ms Rae also advised the session that Mr Bruhn had offered to perform a scientific update of Part II.3, which he had identified as one section from Part I in particular need of revision. Mr Bruhn advised that he would make the draft available to the team on its completion. He had suggested prior to the session that in Pretoria the team may wish to consider focusing on:

- Reviewing progress on, and finalizing, as far as possible, Parts I, II.1, II.2, II.4, II.5, II.6, II.7 and II.8
- Time permitting, reviewing and finalizing, as far as possible, Part III.

3.4.7 In closing, Ms Rae requested the chair to enable as much time as possible during the meeting for the Text Team to further develop the draft text.

### **3.5 Report on Task 5: Image Acquisition and Sorting**

3.5.1 Mr Anderson briefly reported that the image acquisition website is now operational and images are being submitted. It was noted that some potential submitters have had problems obtaining a login to the site but that HKO has dealt with most of these issues.

3.5.2 The session was informed that the number of submissions to date has been lower than expected. The potential reasons for this were discussed:

- The task team may have had unrealistic expectations, in which case it may simply need to wait longer to acquire the images needed.
- If the website was proving too difficult to use or the required process takes too much time, this should be reflected in statistics of the number of registered users for the site being much greater than the number of images submitted. In this case the task team should consider simplification of the submission process.
- If the daily rate of submissions is progressively increasing with time, this might be due to a slow response time of PRs in advertising the opportunity further within their country. In this case no corrective action should be required.
- If the ratio of users to images is low and the number of submissions is not accelerating, then it would suggest that the opportunity to submit images is not widely known, in which case further efforts would be required to more effectively advertise the opportunity. In case this is the issue, the WMO Secretariat agreed to pursue more effective advertisement of the opportunity, by requesting the placement of an advertisement on the WMO Homepage and requesting the WMO communications section to more widely advertise via Twitter and Facebook. Several team members also agreed to pursue the addition of advertisements on their NMHC website. Mr Tam agreed to place an advertisement on his Facebook site. Other options that the session discussed for increasing the image submission rate included sending a second announcement to PRs noting the poor response and repeating the call to advertise the opportunity widely, requesting all CIMO experts to inform a cloud expert within their organization and encourage them to spread the word, drafting a flyer on image submission to help advertise the opportunity, asking Dr Cohn to request imagery of thunderstorm features from experts at the Severe Storms Laboratory.

3.5.3 Mr Tam agreed to extract suitable statistics from the HKO database to assist in diagnosing the cause of the low submission rate.

### **3.6 Report on Task 6: Image Selection**

3.6.1 Mr Anderson described the image selection system that has been developed by Mr Tam and his colleagues at HKO. It involves a member of the image selection team logging in to the website, using various filters, if desired, to target images of a common classification, and then simply grading an image (accept/maybe/reject) for each of its photographic merit, meteorological merit and metadata quantity/quality. Each image is then given a corresponding numerical score and once graded by at least two judges, will be automatically copied to a second level database containing all the images still in contention for selection. Otherwise the image is rejected. This is the triage step.

3.6.2 On completion of the triage step for all images, the selection team can then perform a more rigorous analysis of the remaining candidates, edit the metadata as required, and make the final selection of images to be included in the new edition of the ICA.

3.6.3 Mr Anderson and Mr Lovell advised the team that the image selection system works particularly well and enables them to perform the selection process with optimal ease. The session commended Mr Tam and his programming team for the excellent facility they have provided for this process.

3.6.4 Mr Anderson requested time to be allowed later in the meeting for the members of the image assessment team present to have a breakout group so that they could spend some time assessing some of the imagery, to ensure they are all using a standardized approach to the selection process.

### **3.7 Report on Task 7: Decision Aid**

3.7.1 Ms Thurig-Jenzer addressed the session briefly in regard to the development of the new Decision Aids. Task 7 of the TT-ICA Work Plan is to create an updated Cloud Coding Decision Aid and develop a simplified Cloud Classification Decision Aid (limited to identifying genera) for Volume I.

#### ***Cloud Coding Decision Aid***

3.7.2 At the end of TT-ICA-2 in 2014, version 1 of the updated Cloud Coding Decision Aid was presented. Version 1 was developed by Eliane Thuerig, Colleen Rae, Marinés Campos and Ernest Lovell on the basis of the existing decision aid in the ICA Volume I. In the following months, all suggestions of the task team were discussed at several WebEx sessions and implemented into the draft. The latest result is version 4, dated 4th may 2015.

3.7.3 During the meeting 2015 in Pretoria the question of the cartoon representing CL 4 (Sc cugen) was raised. At the moment the cartoon represents a type 'Sc cugen' that occurs often in the evening when convection ceases. It should be altered so it represents an ascending Cumulus or Cumulonimbus which slows down when reaching a higher layer of stable air and spreads out to a patch of Stratocumulus.

3.7.4 The task team (all members) decided that this work has to be done and included in the final version of the decision aid of low level clouds. Eliane Thuerig will contact the designer of the cartoons and ask for the required changes. The task team (all members) also approved version 4 of the mid-level and high level Decision Aid.

#### ***Simplified Cloud Classification Decision Aid (identifying genera only)***

3.7.5 The simplified cloud classification decision aid has been developed during the last 10 months. Eliane Thuerig has created the first draft and presented version 1 in January 2015 to the Task Team (all members) during a WebEx session. In the course of five months all suggestions and corrections were discussed in the task team and the result was implemented to the simplified classification aid. The final version is version 8, dated 4th may 2015, was approved by the task team.

### **3.8 Report on Task 8: Web Design**

3.8.1 Jim Trice provided a brief summary of the progress he had achieved to date enroute to developing a functional specification of the ultimate ICA website. He had commenced by first developing a list of stereotypical use cases to give some idea of who would be using the ICA, how they would be using it and what ICA features would be important to them. This then led to the development of a set of 'user stories' for each case. Mr Trice provided the session with a presentation of these different user stories. He described seven different types of users and their needs: meteorological trainer, ATC observer, professional meteorologist, voluntary observer, co-opted weather observer, school teacher, amateur cloud enthusiast/photographer. The participants recommended the inclusion of additional user types: professional meteorological observer, navy observer, pilot, journalist.

3.8.2 Mr Trice's presentation was followed by general discussion of each of the user stories and identification of additional classes of user that might be included. The session then suggested that, rather than further refining the user stories, the Web Design Team might make better use of the time in Pretoria by taking the user stories and using them to put together an initial list of high level functional requirements for the ICA website. Mr Trice requested the chair to make time for a breakout session of the Web Design Team so that they could perform this work.

## **4. BREAKOUT GROUPS TO PROGRESS TASKS**

4.1.1 At the conclusion of the task status reports, Ms Thurig-Jenzer proposed that the participants divide into breakout groups to enable the individual sub-groups to progress their work. Three small groups were selected:

- Group 1: Text (Part II): Ms Rae (chair), Ms Campos and Dr Ruedi;
- Group 2: Text (Part III): Mr Anderson (chair), Mr Lovell, Dr Atkinson;
- Group 3: Web Design: Mr Trice (chair), Mr Tam, Ms Thurig-Jenzer

A fourth group was comprised of those members of the image selection team present in Pretoria:

- Group 4: Image Assessment: Mr Anderson (chair), Mr Lovell, Mr Tam.

4.1.2 The session spent the remainder of the first two days of the meeting in the first three breakout groups before coming together again briefly to discuss the requirements of a functional specification for the ICA website. They then resumed working in their three breakout groups until the last day of the session. For the last part of the fourth day of the session, once Groups 2 and 3 had substantially completed their work, Group 4 met to standardize the approach to image assessment. The last day of the session was conducted in plenary.

## **5. WEB DESIGN**

5.1.1 The Wednesday morning session was spent in plenary as the task team considered ICA web design.

5.1.2 Mr Trice presented a list of an initial 20 functional requirements for the website, distilled by Breakout Group 3 from Mr Trice's user stories. The breakout group had also assigned a level of importance (essential, highly desirable, desirable) to each requirement. Extensive discussion followed, during which the participants suggested additional requirements or modifications to those in the list, e.g, inclusion of an additional requirement for several navigation modes to be available: a directory structure map, a contents page, and a search engine. The session was reminded to

take care not to mix functional requirements (the WHAT) with technological solutions (the HOW). The latter will be the task of the web designers.

5.1.3 Mr Tam informed the session that it would be important for the team to consider the functional requirements not only of the website, but also of the database. He then asked for clarification from the session on the need for particular functionalities:

- Should the website be structured according to content or according to application area of the user? After some discussion, the session agreed that the website should be structured according to content.
- Do we need to design the database for the website so that other people can access the database to develop other sites (e.g., training modules)? The session agreed that this should be the case.
- Should it be possible to focus in (e.g., zoom) on specific features of an image? Yes, though this may make the image selection team's job more complex, so a suitable approach would need to be found.

5.1.4 An additional functionality question raised by the session was whether or not, for each cloud type, a 'traffic light' indication (red, yellow, green) is given of the potential impact of the cloud (e.g. Ci would be green, Cb red). It was agreed that this would be a useful feature.

5.1.5 Mr Malcolm McLean, a Pretoria web designer familiar with the ICA, had been invited to address the session on the factors to be considered by a web designer in building a ICA web site. Mr McLean stressed that it will take time to get from what's wanted to what is built, so patience is required from both parties involved in design of a website. The best design principles to be adopted will be dependent on the target audience (a niche group or a broad target?), the size of the audience (100 users or 1000000?), the devices being targeted (just a desk-top PC or everything imaginable?), and whether the content is static or highly dynamic (in this case static). He provided generic advice to the session as follows:

- **A custom-written website versus use of an existing CMS package:** Writing the website specifically for the purpose of the ICA will allow all of the required functionality to be implemented exactly as required. Using an existing CMS package, such as Drupal, Joomla, Wordpress, etc. will often allow a faster start to the site design, but generally requires the functionality requirements to be adapted to what the CMS site is capable of, or requires extensive modification of the CMS package to fulfil these requirements. Through the site being custom-written, it will be also modular and easily maintainable.
- **Designing the site using Responsive Web Design principles:** This means that the website is designed from the beginning to adapt to any device type and screen size that is connecting to it. This means that the website will render differently on a desktop as opposed to an iPad or smart phone, but only a single site with a single set of information is developed and maintained. This also future-proofs the site so that you are not bound to only use the website from standard desktop/laptop browsers, but any device, both present and future, will be able to use the site seamlessly. A further benefit is that mobile devices would be able to use an interface more usable than, for instance, a pdf document which may be cumbersome to find what you're looking for.
- **Printable pages:** The pages describing each cloud will be printable, and will appear in a slightly different format than what is shown on-screen, but will be more suited to display on a page, and without the extraneous navigation and graphical styles associated with a website. Essentially, the printed page would look more like a standard printed document than a print of a web page.
- **Fully dynamic site:** A website that renders itself dynamically means that you can access any of the main site functions from any page without having to hit the Back button, or at the other extreme, present so many navigation options that the page is overwhelmed with navigation.
- **Consistent and simple layout:** The layout of the site should be simple to use and understand and follow an understandable workflow for any visitor. Each page would have a small number of the most closely related clouds to assist identification.

- **Minimal scrolling:** All of the most important information is presented at the top of the page with the less important or less frequently used information being presented further down the page, or available via expanding subsections or pop-up blocks.
- **Multi-lingual:** The site can be developed to be multi-lingual from the start even if only one language is setup initially. Using Unicode character sets, all languages can be represented, including those based on non-Latin alphabets such as Greek, Russian and Chinese.
- **Cater for all experience levels:** Identification tools that cater for any skill level from scholars who don't know all of the technical jargon to meteorology students and beyond.
- **Image tagging:** Image can be tagged to provide additional information when the mouse is hovered over the image with small semi-transparent squares or rectangles highlighting specific areas of interest. Particularly useful if the image contains two types of cloud that will help illustrate the difference between them.
- **Search functionality:** Cloud information can be searchable on any field, be it the general type of cloud, a specific classification or text contained within the description or keyword list.
- **Imagery:** each cloud can have as many images as required to clearly illustrate each type, with additional images also being available for further reference and comparison.
- **Geographic awareness:** If required, geographic aware can be built into the site to present locally taken images first before displaying more general images of each type.
- **Scalability:** Leveraging on some of the most modern techniques and software packages, the site can be made very scalable being able to serve many concurrent users while still remaining responsive. Caching built directly into the web server application can server content as fast as the client can download it. Further utilising the latest HTML5 standards also means that the browser can be instructed what can be cached, thereby decreasing the load on the web server and increasing responsiveness even more.

## 6. BREAKOUT GROUP REPORTING

### 6.1 Breakout Group 1: Text of Parts I and II

#### ***Section I.1 DEFINITION OF A METEOR***

6.1.1 Significant changes have been suggested for this short introductory part to the ICA, which simply contains the definitions a meteor and of the four types (hydro-, litho-, photo- and electrometeors). The text of this Part previously comprised the introductory section of Part III in the 1956 version of the ICA but was moved for the 1978 edition, when the definition of a meteor was changed to include clouds and the International Cloud Atlas became a Manual on the Observation of Clouds **and Other Meteors**. The breakout group suggested that Part I be reabsorbed into Part III and a new introductory section of text drafted to replace it as Part I. However, the details of how this will be done are still to be worked through by the team.

#### ***Section II.1 INTRODUCTION***

6.1.2 The group suggested changing II.1.1 Definition of a Cloud and changing the format of the text of some subsequent paragraphs to use a bullet point approach for easier reading. No other major changes to the text are recommended but the format of Tables II.1.4 and II.1.5 will be modernized.

#### ***Section II.2 DEFINITIONS OF CLOUDS***

6.1.3 A number of changes were proposed to II.2.1.2 ETAGES:

- replacement of the term ETAGE with LEVEL.
- the table of approximate heights of the three levels for each region will be modernized and a pictorial representation added.
- Minor changes to the text for:
  - II.2.3.1 GENERA,

- II.2.3.2 SPECIES,
- II.2.3.3 VARIETIES and
- II.2.3.4 SUPPLEMENTARY CLOUDS AND ACCESSORY FEATURES
- the format of all tables is to be modernized.

### **Section II.3 DESCRIPTIONS OF CLOUDS**

6.1.4 This lengthy section was under independent revision by Mr Bruhn (not present in Pretoria). However, to demonstrate to the session how he is approaching the task, Mr Bruhn joined by webex from Australia and presented his proposed revision of II.3.6 Nimbostratus (Ns). Detailed wide-ranging discussion on this and other topics within the session followed, resulting in the following decisions:

- Agreement was reached on a proposed amendment to the definition of nimbostratus. (The last sentence of the current definition regarding pannus will be removed);
- The nimbostratus entries (and related clouds) in the associated tables (of II.1 and II.2) were agreed;
- It was agreed that the term 'etage' should be changed to 'level' throughout the ICA;
- A reference to noctilucent clouds occurring in the mesosphere should be added to that section;
- An apparent anomaly in the table of II.7.2.1 is to be resolved;
- The removal of the association between Cu/Sc and genus was agreed;
- A long discussion on whether or not Ac can precipitate resulted in no consensus being reached, so the session agreed to consider this further after the meeting;
- A discrepancy in the level heights defined in the CIMO Guide with those in the ICA was noted and the WMO secretariat was requested to follow this up.

6.1.5 Mr Bruhn agreed to provide the entire draft revised text of Section II.3 to the task team for comment once he has completed it.

### **Section II.4 OROGRAPHIC INFLUENCES**

6.1.6 The group proposed that the opening sub-section be modified and some introductory text be added. The text of the section will be bulleted under specific topics and diagrams will be added.

### **Section II.5 CLOUDS AS SEEN FROM AIRCRAFT**

6.1.7 The breakout group noted that the text of this section was particularly dated but that the members of the task team did not have the expertise needed to modernize it. It also noted that the initial guidance provided by the 2011 Geneva workshop was that the ICA should be for surface observers (including Alpine observers) but that it should not concern itself with aircraft or space-based observations. The group sought advice from the session on how to deal with these different considerations. Should Section II.5 be retained or omitted? After lengthy discussion, it was agreed that the approach taken in Section II.5 of considering the appearance of clouds from below, within and above the cloud was a robust approach that would address the need for the ICA to provide for Alpine observers (whilst still providing for the needs of aviators as well), without explicitly addressing cloud observation from aircraft. It suggested that the text from Section II.5 on cloud observation from above and within the cloud should be incorporated into the text of Section II.3 and that other useful text from II.5 be similarly incorporated into the text of other sections, so that Section II.5 can be discontinued. To address the lack of expertise in the team for modernizing the content, Mr Anderson agreed to approach the Royal Meteorological Society's Special Interest Group on Aviation Meteorology to request it to update the relevant text.

### **Section II.6 SPECIAL CLOUDS**

6.1.8 The breakout group noted that proposed changes to cloud classifications by the task team, which would be included in Section II.3, had flow-on effects for this section, so that the section

should be modified to take these into consideration. Mr Anderson agreed to draft revised text for this section after the session.

### **Section II.7 OBSERVATION OF CLOUDS FROM THE EARTH'S SURFACE**

6.1.9 With the omission of Section II.5 in the revised ICA, the group agreed that this section would require some change also. Ms Rae informed the session that the Text Sub-Group would revise the section after the meeting. It was also noted that the tables should be modernized and modified as required.

### **Section II.8 CODING OF CLOUDS $C_L$ , $C_M$ , $C_H$**

6.1.10 The breakout group noted that this section should require little in the way of change except for replacement of the cloud coding decision aids (II.8.3.2-II.8.3.4) with those developed by the task team (see Section 3.7 above). The Text Sub-Group agreed to revise this section after the meeting.

## **6.2 Group 2: Text of Part III**

### **New Section III.1 DEFINITION OF A METEOR**

6.2.1 The breakout group was reminded of the discussion regarding the proposed restructuring of the ICA to relocate the introductory section I.1 to the beginning of Part III, which would require the renumbering of all subsequent sections of Part III.

### **Section III.1 CLASSIFICATION AND SYMBOLS OF METEORS OTHER THAN CLOUDS**

6.2.2 The breakout group examined this section closely but concluded that very little change was likely to be required.

### **Section III.2 DEFINITIONS AND DESCRIPTIONS OF METEORS OTHER THAN CLOUDS**

6.2.3 With regard to III.2.1.1:

- (1) and (2): ‘...to less than 1000 metres’ should be inserted at the end of each FOG definition.
- Some minor text changes were suggested in the FOG commentary.
- An additional part (3) should be added to explicitly define MIST (fog-like but causing reduction in visibility to not less than 1000 metres).

6.2.4 With regard to III.2.1.2, the sub-group suggested:

- small changes to (1) in the commentary on RAIN,
- a complete revision of (2) SUPERCOOLED RAIN and (4) SUPERCOOLEED DRIZZLE,
- minor word changes to the definition of (5) SNOW,
- correction of a typographical error in (8),
- changes to the commentary on (9) HAIL, and
- slight changes to the wording of (10) and (11) to clarify the differentiation between small hail and ice pellets.

6.2.5 With regard to III.2.1.3:

- Page 114 - footnote to be moved into text for (a)drifting snow and (b) blowing snow.
- (2) delete last sentence from Spray commentary. Foehn gales are a very specific case.

6.2.6 With regard to III.2.1.4:

- (1) Minor word changes to the Commentary for Deposit of fog droplets.



- (2) Delete "during the warm part of the year" from 2nd paragraph of commentary for (a) Dew Proper, minor word changes to the 3rd paragraph, word changes to the Commentary for (b) Advection Dew.
- (3) Insert a new sentence into the Commentary for White Dew.
- (4) insert a missing comma into sentence for (a) definition of Hoar Frost Proper.
- (4) slight word change to last sentence of Commentary for (b) Advection Hoar frost.
- (5) Word changes to definition of Rime.
- (5) Minor word change in Commentary for (b) Hard Rime and (c) Clear Ice (e.g "interstices" - replace with "air gaps").
- Move NOTE to the end of the Commentary for Rime.
- (6) Minor word changes to Commentary / Note for Glaze.

6.2.7 With regard to III.2.1.5:

- This section needs to be thoroughly updated following consultation with subject matter experts (outside of the task team).

6.2.8 With regard to III.2.2.2:

- & (2) Footnote at bottom of page 120 to be moved into definitions for (a) drifting dust/sand and (b) blowing dust/sand.

6.2.9 With regard to III.2.3:

- Major change required.
- This section is to be thoroughly updated. Many changes have been made by the sub-group, but it was also recognised that external expertise should also be consulted.

6.2.10 With regard to III.2.4:

- Major change required.
- This section is in need of a thorough update to take account of the latest science.

6.2.11 With regard to III.3.1:

- Insert the word "location" into Introduction.

6.2.12 With regard to III.3.2:

- Minor word change to last sentence.

6.2.13 With regard to III.3.4:

- Change order / priority of drawings and photographs in 1st sentence.
- Delete black mirror. Not in common usage.

### **6.3 Breakout Group 3: Imagery Sub-Group**

6.3.1 The members of the Imagery sub-group who were present in Pretoria took the opportunity afforded by face-to-face meeting to conduct a 1 hour standardisation meeting on image selection. This involved actual assessment by the small group of a number of cloud photographs that had been submitted on the live Image Submission website. This proved very useful to ensure thorough familiarity with the Image Assessment part of the website, and to ensure consistency in the assessment process across the sub-group members.

### **6.4 Breakout Group 4: Web Design**

6.4.1 After the plenary session helped to refine the case studies and user stories this breakout group discussed how the information could be used to compile a comprehensive list of functional requirements for the website. The resulting list of functional requirements was broken into three categories:

- Top level requirements e.g. branding, website security, portability across platforms etc.
- Required functional capabilities: e.g. comparison function for comparing 2 or more clouds, zoom function, search function etc.
- Layout/presentation requirements e.g. inclusion of reference imagery, clear display of WMO regulatory material, accessing comprehensive metadata.

6.4.2 Considerable time was devoted to refining and agreeing the requirements in each of the above sections, with a view to passing this document to the web developers as an overall template of what needs to be achieved. The refined draft list of functional requirements, initially drafted by Mr Trice and developed during the session, is at [Annex IV](#).

6.4.3 The breakout group had then considered how the web-page should be structured. In particular it discussed which functions would be available on the front page and which functions would be accessible from all pages (via 'banner' options). This led to an initial 'functional mock-up' being produced, although it is ultimately intended that the detailed web design will be aligned with the flow of the revised text, so completion of the functional mock-up was postponed until the text flow diagram has been completed. Ms Rae agreed to provide a finalised text flow diagram to the team within the next few weeks and Mr Trice agreed to use that to further develop the functional mock-up, then share it with the team on its completion.

6.4.4 Mr. Tam noted that, based on the draft text flow diagram, more links would be required from photometers to cloud types (those which cause or lead to the specific types of photometers). He also noted that it would be important to clearly identify all sections of the ICA text that constitute technical regulation material so that the database, which will comprise an integral part of the website, can be correctly designed. Mr Tam agreed to use the finalized text flow diagram to further iterate the functional specification and then share it with the team.

6.4.5 The question was raised as to who would be engaged to build and host the ICA website. The session was reminded that, once the functional specification is completed, it will be provided to the HKO team, which will consider whether it can and wants to take the task on. Mr. Tam suggested that, based on the current draft functional specification, it is likely they will want to take the task on and that the website can probably be completed within a year.

6.4.6 The potential capability to place the entire ICA onto a dvd (or data device), for use in the field without internet access, was briefly discussed. Mr Tam suggested that this is unlikely to be feasible but that a reduced functionality version could be mapped to a e-book and from there it could be accessed via e-book, smart phone, or some other medium without the need to develop a number of specific applications (with a different one for each medium), which would greatly increase the maintenance load.

## 7. OTHER BUSINESS

### 7.1 Poor Response to Letter to PRs

7.1.1 Detailed discussion occurred regarding the relatively small number of images that had been submitted to the ICA Image Submission site by the start of the current session. A number of potential causes was suggested. Each is considered below, along with possible means of assessing its likelihood, and potential means of addressing it, to increase the flow of candidate images being submitted to the website.

7.1.2 **Too few PRs have onforwarded the invitation letter.** It would be difficult to determine whether this might be the case. Perhaps the number of countries from which submissions have been received provides an indication of those PRs that have certainly sent the invitation onwards,

but this provides no information regarding those who may not have. It was suggested that it may be best for the secretariat to draft a follow-up letter to the PRs advising of the poor response and urging them to make a special effort to advertise the opportunity in their country, and perhaps to widen the target audience to include those other than professionals or dedicated amateurs. Mr Tam suggested he could place an advertisement on his Facebook page and that Dr Cohn might agree to email his contact at the Severe Storms Laboratory and ask him to advertise the opportunity. Other team members volunteered to request their organizations to advertise it on their webpage. Mr Anderson suggested he could contact various meteorological societies and alert them to the letter to PRs. The session also requested the WMO secretariat to email all CIMO experts and ask them to contact a cloud expert in their organization and ask them to spread the announcement to other national experts and the secretariat was also requested to draft a flyer to help the team members advertise the submission site.

**7.1.3 PRs are onforwarding the invitation but the timescale for this process is longer than the time elapsed to date.** Were this the case, then it should be evidenced by a gradual increase in the rate of submissions. Mr Tam provided the session with statistics showing a very recent increase in the daily submissions, but it was not sufficiently long-lasting to draw definite conclusions. Were this the cause, then no specific remedial action should be required: with time the submissions should come in.

**7.1.4 PRs have onforwarded the invitation but too few cloud photographers are sufficiently motivated to submit.** The session could think of no way to diagnose whether this might be the cause, nor any useful solution were that the case, other than offering prizes for submission.

**7.1.5 Candidates are having too much difficulty acquiring an account on the website.** This should be evidenced by potential submitters contacting the 'Contact Us' address on the website and advising of their difficulties.

**7.1.6 Candidates have acquired an account but have too much difficulty submitting images** (the process takes too long or is too complex). This might be evidenced by the number of account holders greatly exceeding the number of submissions. Mr Tam was asked to check this statistic.

**7.1.7** The discussion concluded with the chair requesting Mr Tam to regularly update and share his website usage statistics.

## **7.2 Next Teleconference of the Task Team**

**7.2.1** The session agreed to hold its next webex session at 1200 UTC on 22 October 2015 and requested the WMO secretariat to organize this.

## **8. REVIEW AND REVISION OF WORK PLAN, SCHEDULE & SUBGROUPS**

**8.1.1** The session reviewed and updated its Work Plan to take into account the work and discussion of the session. The updated Work Plan is at [Annex V](#). An additional sub-task was included in the Work Plan, which involves preparation of a document describing the major changes being made to the ICA, so that this information can be included in the preface to the new version.

## **9. CAS COMPETITION JUDGING**

The session was informed that Mr Gavin Pretor-Pinney, President of the Cloud Appreciation Society, had sought the agreement of a member of the Task Team to announce the winner of their asperitas photo competition at their annual conference on Saturday 26 September. After some discussion, George Anderson agreed to contact Mr Pretor-Pinney and make himself available to make the announcement by teleconference during the conference.

Mr Pretor-Pinney had provided the WMO secretariat with eight shortlisted 'finalist' photographs for the CAS competition, and the task team had agreed to judge the winner during the session. After lengthy consideration, the task team members present chose an entry by Mr Gary McArthur as the winner. The reasons for their selection of this image over the remaining seven very worthy candidates were that it comprised a typical and excellent example of asperitas, it displayed more of the features in the definition of asperitas than any other, and is a particularly unambiguous image: there is little chance that anyone could be in doubt about what part of the image is the asperitas cloud.

#### **10. DRAFT REPORT OF THE SESSION**

The session agreed to finalise its final report by correspondence.

#### **11. CLOSURE OF THE SESSION**

The Session closed on Friday 25 September at 16:00.

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## PARTICIPANTS

|  |  |
|--|--|
| <p><b>Eliane THURIG-JENZER</b></p> <p><i>Chair</i></p>                       | <p>Federal Office for Meteorology and Climatology<br/>MeteoSwiss,<br/>Zurich<br/><b>Switzerland</b><br/>tel.:<br/>fax:<br/>eliane.thuerig@meteoswiss.ch</p>  |
| <p><b>George ANDERSON</b></p>  | <p>Met Office,<br/>Joint Operational Meteorology and Oceanography<br/>Centre (JOMOC)<br/>NCC Northwood HQ<br/>Sandy Lane Northwood<br/>Middlesex HA6 3HP<br/><b>UK</b><br/>Tel: +44 (0)1923 958112<br/>(GPTN Tel: 9360 58112)<br/>george.anderson@metoffice.gov.uk</p> |
| <p><b>Michael BRUHN</b></p> <p><i>(By Webex for part of the meeting)</i></p> | <p>Australia<br/>tel.:<br/>fax:<br/>michaelbruhn@bigpond.com</p>   |
| <p><b>Maria Inés CAMPOS</b></p>  | <p>National Weather Service- Training Department<br/>Oro 3995<br/>1636 Buenos Aires<br/><b>Argentina</b><br/>tel.: 1557961917<br/>fax:<br/>marinescampos27@gmail.com</p>   |
| <p><b>Ernest LOVELL</b></p>  | <p>Caribbean Institute for Meteorology and Hydrology<br/>(CIMH)<br/><b>Barbados</b><br/>tel.:<br/>fax:<br/>elovell@cimh.edu.bb</p>   |
| <p><b>Colleen RAE</b></p>  | <p>Qualification manager: Observations<br/>South African Weather Service<br/>Private Bag X 097<br/>Pretoria 0001<br/><b>South Africa</b><br/>tel.: +27 12 367 6019<br/>fax: +27 86 615 5973<br/>Colleen.Rae@weathersa.co.za</p>  |
| <p><b>Kwong Hung TAM</b></p>   | <p>134 A Nathan Road<br/>Hong Kong<br/><b>China</b><br/>tel.: 852-29268414<br/>fax: 852-23119448<br/>khtam@hko.gov.hk</p>  |

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|---|--|
| <b>Jim TRICE</b>  | Land Networks Manager<br>U.K. Met Office<br><b>UK</b><br>tel.:<br>fax:<br>jim.trice@metoffice.gov.uk                         |
| <b><u>WMO SECRETARIAT</u></b><br><br><a href="http://www.wmo.int/pages/prog/www/index_en.html">www.wmo.int/pages/prog/www/index_en.html</a> | World Meteorological Organization<br>7, bis avenue de la Paix<br>Case Postale 2300<br>CH-1211 GENEVA 2<br><b>Switzerland</b> |
| <b>Observing and Information Systems Department (OBS)</b>   |  |
| <b>Roger ATKINSON</b><br>Scientific Officer, Instruments and Methods of<br>Observation (IMO)  | Tel:    +(41 22) 730 8011<br>Fax:    +(41 22) 730 8021<br>E-mail <a href="mailto:RAtkinson@wmo.int">RAtkinson@wmo.int</a>    |
| <b>Isabelle RUEDI</b><br>Head, Instruments and Methods of Observation<br>(IMO)  | Tel:    +(41 22) 730 8278<br>Fax:    +(41 22) 730 8021<br>E-mail <a href="mailto:IRuedi@wmo.int">IRuedi@wmo.int</a>          |

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Table of Suggested Changes to Parts I and II (Provided by Mr Bruhn).

| <i>ICA Part</i>  | <i>Task</i>  | <i>Comment</i>   |
|--|--|--|
| I –<br>Definition of a Meteor ....                           | Move to the beginning of Part III - Meteors other than Clouds  | Unnecessary detail to have at the beginning of the manual. If you're unsure, have a look at the 1956 edition.  |
| Hydrometeor table  | <ol style="list-style-type: none"> <li>1. Add "Showers of Rain", "Showers of Snow" and "Showers of Ice Pellets";</li> <li>2. Add Cb to showers of ice pellets;</li> <li>3. Define "Showers" in Part III – Meteors other than Clouds</li> </ol> | <ol style="list-style-type: none"> <li>1. Aligns with present weather codes and see II.7.2.1 - Table on pg 71;</li> <li>2. Consistent with II.3.10.7 and II.7.2.1</li> </ol>   |
| II.1.1<br>Definition of a cloud                              | <ol style="list-style-type: none"> <li>1. Decide on amending definition to ensure clouds such as volcanic cloud are covered.</li> </ol>  | Discussed during WebEx and email in Feb '15 but no decision reached. Check II.1.3 2 <sup>nd</sup> paragraph  |
| II.1.1<br>Definition of a cloud:<br>2 <sup>nd</sup> sentence | <ol style="list-style-type: none"> <li>2. Can a cloud <b>not</b> include "non-aqueous liquid or solid particles such as those present in fumes, smoke or dust"?</li> </ol>   | <ol style="list-style-type: none"> <li>1. Homogeneous nucleation of pure water in the atmosphere requires supersaturations of 300-400%<sup>1</sup>.</li> <li>2. Homogeneous nucleation of an ice crystal (vapour to solid) requires temperatures below -65°C and supersaturations ~1000%<sup>2</sup>.<br/>A cloud <b>must</b> include condensation and/or ice nuclei.</li> </ol> |
| II.1.2<br>Appearance of clouds                               | Consider moving complete section to Part II.7 – "Observations of Clouds from the Earth's surface"  | Heady (not heavy) detail more appropriate within the Observing chapter   |
| II.1.3.1<br>Genera   | <p>Update to something like:<br/>"The classification of clouds is based on ten main groups, called genera. A cloud can only belong to one genus."<br/>Check on interchangeability between genera and genus. Ensure consistency!</p>            | This "classification of clouds" was introduced in 1956, not 1975. Replace "mutually exclusive" and define "genus"  |
| II.1.3.5<br>Mother-clouds                                    | Update with aqua, flamma and homogenitus and homomutatus   |  |
| II.1.4   | Update table with new classifications  |  |
| II.1.5   | Update table with new classifications  |  |
| II.2.1.1<br>Height, Altitude and Vertical ..                 | Change heading to "Some useful concepts and definitions"   |  |
| "  | Decide on status of Part II.5 – Clouds as seen from Aircraft. If not retaining, remove reference to Altitude   |  |
| "  | Remove narrative: "It is often   | This is not a story, it is a   |

|  |  |  |   |
|--|--|--|---|
|  |  | important to refer to”.  | technical reference!  |
|  | “  | Add definition of “Cloud Base”   | Not defined anywhere in ICA. Refer CIMO (2014) for definition   |
|  | “  | Add definition of Tropopause   | Put in Glossary?  |
|  | <b>II.2.1.2</b><br>Etages  | Reword complete section and remove narrative. “Each etage is defined by the range of levels at which <b>the base of</b> clouds of certain genera occur most frequently. In some instances, the cloud base may lower into another etage or the cloud extends into higher etage/s. These genera are:<br>(b) <b>Altostratus</b> and <b>Nimbostratus</b> for the middle ..;<br>(c) <b>Stratocumulus</b> , <b>Stratus</b> , <b>Cumulus</b> and <b>Cumulonimbus</b> for the low etage ...” | Part II.3 “Description of Clouds” can deal with Nimbostratus lowering and Cu/Cb extending and ....                                      |
|  |  | Add idealized illustration of varying height of the tropopause   | Image 1 & 2 – suggestions   |
|  |  | Define etage   | Glossary?   |
|  |  | Add illustration of etages with genera   | Image 3 - suggestion  |
|  | <b>II.2.2</b><br>Observational conditions to which definitions ... | Consider moving to II.7 – Observations of Clouds from the Earth’s surface  |   |
|  | <b>II.2.3.2</b>  | Update with new species  |   |
|  | <b>II.2.3.3</b><br>Varieties                                       | “have led to the introduction of the concept of ...” “A given cloud may bear the names of different varieties, which means that varieties are not mutually exclusive”. “On the other hand ...” “The fact that a number of ... .”<br>“The definitions are given below.”   | Has to be the worst paragraph in the document. Two or three lines would suffice instead of six.<br><br>Reads like a running commentary. |
|  | <b>II.2.3.4</b>  | Update with new supplementary features and accessory clouds  |   |
|  | <b>II.4</b> –<br>Orographic Influences                             | Check wording and science. 1 illustration = 1000 words. Should be possible to use images to identify feature and flow as well as illustrations.  | Mike B to develop an “Orographic Image” requirement list for the Image Assessment team  |
|  | <b>II.5</b> –<br>Clouds as seen from Aircraft                      | Retain or remove?  | Preference – remove pending updating? Time frame to update and by whom?   |
|  | <b>II.6.1</b> –<br>Special Clouds                                  | Check and update science. e.g. Do contrails “persist for several hours especially when Cirrus or Cirrostratus is present”?   |   |
|  |  | Minor or major adjustments to Nacreous and Noctilucent   |   |



|  |   |   |  |
|--|---|---|--|
|  |   | clouds?   |  |
|  | <b>II.7</b> – Observations of Clouds from the Earth’s surface | Introduction is incredibly detailed and long winded. Replace with a hyperlinked CONTENTS page that includes additional sections on items such as “Maintaining weather watch” “Watching the whole sky” “Order of Observation” “Occupational Health and Safety - Protect your eyes” ..... |  |
|  | <b>II.7.2.1</b> Identifying the Genus                         | Tabular guide - consider a better format for web based version  |  |
|  | “   | Add new Supplementary Features and Accessory clouds   |  |
|  | <b>II.8</b> - The Coding of ..                                | Review “ Special Coding Instructions” for all $C_L$ , $C_M$ and $C_H$ with a view to removing said instructions. In most cases would require addition comment in the “Technical Specification”  | Example;<br>“ $C_L = 1$<br>1. Technical Specification<br>Cumulus humilis or Cumulus fractus not of bad weather, or both.<br><b>No other low cloud present.</b> ”   |
|  | <b>II.8.2.1.3</b><br>$C_L = 2$<br>(e)<br>Further Remarks      | Evidence of Cu med and Cu con, “especially the latter”;<br>1. Often appearing in a sky with Ci spi;<br>2. Frequently accompanied by Ac cugen?   | Neither observation is my experience.  |
|  | <b>II.8.2.1.5</b><br>$C_L = 4$<br>Further Remarks             | For how long is the Sc identified as cugen?   | Suggest that the observation transitions to $C_L = 5$ when: <ul style="list-style-type: none"> <li>• all evidence of Cu has gone; or</li> <li>• Cu no longer reaching Sc layer; or</li> <li>• Cu penetrating Sc and no longer spreading out.</li> </ul>  |
|  | <b>II.8.2.2.3</b><br>(e)<br>Further Remarks                   | “ $C_M = 2$ should be replaced by $C_M = x$ ”   | Typo error; “x” doesn’t exist in Code Table 0515   |
|  | <b>III</b> – Meteors other than Clouds                        | Discuss all issues raised by George   |  |
|  | <b>III.2.3</b><br>Photometeors<br>(8) Shimmer                 | How does shimmer differ to a lower (inferior) mirage? Current commentary and definition is useless.   | “Shimmer consists only of the distortion of distant objects by the fluttering effect, whereas the (lower) mirage produces an inverted image”. <i>Guide to Surface Meteorological Observations</i> (Bureau of Meteorology. Melbourne 1971)<br>“Shimmering is caused by multiple refraction of light as it passes from the object through a field of vertically-arranged filaments |

|  |   |  |  |
|--|---|--|--|
|  |   |  | <p>of air of differing density. A mirage is caused by the refraction of light from the sky as it passes through the horizontal temperature (density) stratification of the lower atmosphere, and the amount of bending depends on the lapse rate.” T.R.Oke <i>Boundary Layer Meteorology</i> (London, Methuen &amp; CO LTD 1978) pg 66</p> |
|  | <p>III.2.3<br/>Photometeors<br/>(11) (d)<br/>Crepuscular rays</p> | <p>Accepting the etymology of crepuscular, elevate the text in the note to the body. The definition in the note is now in universal use.</p> | <p>How does “a layer of haze” enhance crepuscular rays? The best rays I’ve seen have consistently been in post-frontal polar air masses. Mike B to provide authoritative references on subject.</p>  |

DRAFT

**Additional Terms Suggested for the Glossary during TT-ICA-3**

Agglomerated

Granulometry

Guttation

Sublimation

Condensation

Evaporation

Deposition

Freezing

Melting

Black Ice

Bush

Gibbous

Refrangibility

Barrage cloud

DRAFT

## Draft Prioritized Functional Specification for the Web-Based International Cloud Atlas

### A: Top Level Requirements

#### 1. Flexibility

The website shall be updatable in future, e.g., for a change in branding or to remain accessible on modern devices.

*Note: The underlying content is not expected to change.*

(E)

#### 2. Branding

The look and feel of the website shall be consistent with WMO branding.

*Note: Guidance from WMO: 'All WMO websites are to follow the look and feel of the main site. Differences should not be noticeable to the user. The same banner, fonts, template structure should be used.'*

(E)

#### 3. Performance

a) The website shall have high availability/low downtime (24/7).

b) The website must enable users with limited bandwidth to download information in reasonable time.

c) The website/web-server shall be able to cope with periods of peak demand i.e. at launch.

*Note: Could compromise on initial resolution of photos so that speed isn't affected for users with narrow bandwidth (as long as fine detail of cloud structures is still viewable).*

(E)

#### 4. Website security

The website shall have a high standard of security to prevent malicious attacks from hacking the site and compromising the content or functionality. This must be done whilst also enabling role-based Access – see 8.

(E)

#### 5. Discoverability

The website should enable the public to easily find this website e.g. via links from WMO and by Google search (may require a period of search engine optimisation).

(HD)

#### 6. Ease of translation

The website shall be easily translatable into other languages without significant reconstruction work.

(E)

#### 7. Portability

The website should be written in such a way that it is viewable/usable on a range of devices e.g. phones, tablets, PCs, laptops. Technology solution : Responsive Design/HMTL5.

(HD)

#### 8. Database accessibility

The website could have role-based database access (to WMO or other authorised groups) so that other publications (e.g. training materials) can be produced.

*Note: An alternative solution would be for WMO to enable access to the source material (possibly held at WMO) rather than access via the TT-ICA.*

(D)

#### 9. Ownership

The copyright for the website shall be owned exclusively by WMO.

(E)

#### **10. Compatibility with Submission Portal**

The supporting database shall be compatible with the database for the image submission portal.

(E)

#### **11. Website Structure**

The structure of the website shall be in line with the text flow diagram (from Vol 1.)

(E)

### **B: Functional Capabilities**

#### **12. Zoom Feature**

The website should enable the user to zoom in on particular features of images.

*Note: this could be done via an explicit zoom feature or enabling users to download higher resolution images (13).*

(HD)

#### **13. Filter functions**

The website should have filter search (e.g. radio-buttons) to enable the user to drill down from low/med/high etage through cloud genera, species, variety.

(HD)

#### **14. Search function**

The website shall have a text search with auto-complete & suggestions i.e. while inputting the search, relevant items are suggested.

(E)

#### **15. Cloud comparison capability (2 or more clouds of same or different type)**

It shall be possible to use the website to compare (side by side) 2 or more (probably up to 4) images. Comparison should be available for similar clouds, the same cloud in different climatic zones, the same cloud in different seasons, different clouds in same genera, different clouds in same species, or any 2 clouds, all images of a particular cloud, or meteor, or feature (not necessarily at the same time).

(E)

#### **16. High resolution images.**

The website should provide high resolution images on demand (accompanied by the relevant metadata & captions on demand).

*Note: This is a possible solution to address performance requirement (3) of smooth/fast access via low band-width.*

(HD)

#### **17. Time lapse/movies**

The website should have a standalone section for time-lapse imagery, as well as relevant links in metadata of individual cloud types.

(HD)

*Note: Gallery shall contain images and time-lapse/movies.*

(E)

#### **18. Similar Clouds Feature**

The website shall show for each individual classification a list of the relevant similar classifications and should enable display of relevant text from Volume 1.

(E)

#### **19. Cloud features reference system**

Website shall have the facility to highlight particular features for any classification. e.g. photo tagging.

*Note: maybe keep existing system for e-book & printed version.*

**(E)**

**20. Feedback mechanism**

The website shall have some feedback mechanism. This will be available at least for B-version/focus groups and for 3-6 months after launch.

**(E)**

**21. Geographical awareness**

The website could be capable of determining the user's basic location. This is required to place the user in the correct climatic zone. It would be used to give priority in searches & filters to clouds in the user's climatic zone.

**(D)**

**22. Multiple methods of navigation**

The website shall contain a site map and contents page.

*Note: search function is specified in 14 so not included here.*

**(E)**

**23. Transportability**

There shall be an alternative to the main website that can deliver most of the content without needing continuous internet connectivity.

*Note: Initial thinking is that this could be delivered by e-book or printed version.*

**(E)**

**C: Layout/presentation Requirements**

**24. Clarity of WMO regulatory material**

Text in Volume 1 which is part of WMO Technical Regulations shall be clearly marked, e.g., in a greyed out box.

**(E)**

**25. Accessibility of comprehensive metadata**

The website shall have links from images to all associated metadata, including graphics files e.g. soundings (& relevant captions relating to supplementary metadata).

*Note: Possibly not on e-book (or equivalent), but if excluded then could include a link or reference to web version of ICA.*

**(E)**

**26. Large print version for visually impaired?**

Website could be able to display in a format which is suitable for visually impaired.

**(D)**

**27. 'Local' Clouds**

The website could have a separate section on 'local clouds' (as well as being included under cloud type).

**(D)**

**28. Link from Graphical Decision Aid to cloud photos**

The website shall have links from the cartoons of the graphical decision aids to the cloud images.

**(E).**

**29. Accessibility of relevant text (Volume 1) alongside imagery**

The website shall enable viewing of relevant images for any classification together with text (from Volume 1).

*Note: this is a layout consideration but how could it be done? "smart scroll", 'radio buttons'? Initial thinking is that image + metadata will give a busy enough screen, so maybe scroll down is needed.*  
**(E)**

**30. Method of conveying Impacts**

The website could have a method of conveying impacts of different types of classifications. E.g. traffic lights.

**(D)**

**31. Inclusion of reference imagery**

The website shall include the imagery from the 1975 edition as 'reference imagery', and this imagery shall be available via links from all other imagery for that classification.

*Note: This is to preserve traceability.*

**(E)**

**32. Ability to display an image together with metadata**

The website shall allow the user to display images of any classification together with its metadata.

**(E)**

**33. Ability to display an image on its own**

The website shall allow the user to display images of any classification without metadata or text.

**(E)**

**34. Ability to display an image together with relevant text**

The website shall allow the user display images of any classification together with accompanying text from Volume 1.

**(E)**

**D: Functionality required, but not within ICA**

**35. Cloud features reference system**

TT-ICA shall have the ability to tag/label the cloud features in the images.

*Note: It's likely that the system for creating this information (text and co-ordinates) will exist outside of the ICA e.g. in the submission portal for the image team (or others) to use. The resulting information will be necessary for the reference system within the website*

**(E)**

*Note: Priorities: Essential = (E), Highly Desirable = (HD), Desirable = (D)*

*Note: The term 'classification' is used in this document as a general term which includes clouds and other meteors.*

**Workplan of the Task Team on the International Cloud Atlas (2014-2018)**

(Version: as approved by CIMO-MG-13 in Dec. 2014, updated 25 September 2015)

| No. | Task description   | Person responsible  | Action  | Deliverable  | Deadline for deliv.   | Status [%]              | Comments   |
|-----|--|---|---|--|---|-------------------------|--|
| 1.  | Establish sub-groups as required (text experts, image experts, decision aid) and prepare detailed plan of action | All, <b>Cohn, Bruhn</b>   | 1. Develop project plan<br>2. Continuous review.  | 1. Detailed Project Plan<br>2. Refinement of plan.   | 1. Sep 2014, then<br>2. ongoing   | 100<br>50               | CIMO-16 4.35-36  |
| 2.  | Identify needs for new/replacement imagery and metadata. Generate a list of images and metadata required         | Image Expert Sub-Group: <b>Bruhn (lead)</b> , Anderson, Trice (may need others)                       | 1. Review imagery<br>2. Prepare list of required images and metadata  | 1. List of the needs for new/replacements imagery and metadata   | 1. Oct 2014<br>2. Oct 2014  | 100<br>100              |  |
| 3.  | Draft the new Glossary   | Text Expert Sub-Group - Glossary: <b>Lovell (lead Glossary)</b> , Rae, Cohn (eg NSSL liaison), others | 1. Prepare List<br>2. Add definitions<br>3. Finalise glossary   | 1. List<br>2. Glossary of terms<br>3. Final version  | 1. 80% Dec 2014<br>2. 100% Apr 2015<br>3. Feb 2016                        | 100<br>90<br>0          | Finalisation now awaits finalization of text and submission to EC-68 with text |
| 4.  | Review, revise and update text   | Text Expert Sub-Group: <b>Rae (lead)</b> , Anderson, Lovell, Cohn, need others                        | 1. Review<br>2. Revise/update<br>3. Finalise text   | 3. Completed text  | 1. Oct 2014<br>2. 80% Mar 2015<br>3. Feb 2016                             | 100<br>60<br>0          | Must be completed in time for submission to EC-68 in May/Jun 2016              |
| 4a  | Describe changes in revised ICA  | <b>Cohn</b>   | Prepare a short document describing the main changes from the 1987 version, for inclusion in a new preface to the 2016/7 version. | Draft document   | Feb 2016  | 0                       |  |
| 5.  | Acquire and sort candidate imagery   | Secretariat, <b>Tam</b> , Trice   | 1. Build and test web portal<br>2. Request submissions<br>3. Sort/Assess Images/Metadata  | 1. Test portal ready for testing.<br>2. Live portal built, debugged.<br>3. Letter to PRs etc<br>4. Full set of candidate | 1. Dec 2014<br>2. Feb 2015<br>3. July 2015<br>4. 95% Feb 2016<br>100% May | 100<br>100<br>100<br>10 | This is the triage step.   |



| No.                   | Task description   | Person responsible  | Action  | Deliverable  | Deadline for deliv.                           | Status [%]  | Comments   |
|-----------------------|--|---|---|--|---|-------------|--|
|                       |  |   |   | images and metadata online   | 2016  |             |  |
| 6.                    | Select Imagery   | Image Expert Sub-Group  | 1. Select prov image set<br>2. Assemble associated metadata, Compose descriptions/captions. Check permissions, etc. If issues, reject, go back and select new prov image and process.<br>3. Get second opinion on final image and metadata. | 1. Prov Imagery Set<br>2. Associated metadata completed<br>3. Completed and posted imagery set | 1. Jan-May 2016<br>2. Sep 2016<br>3. Nov 2016 | 0<br>0<br>0 | 1. Reduce no of images to final number (prov images)<br>2. Final image selection is made (1 x final number)    |
| 7.                    | Create an updated Cloud Coding Decision Aid and develop a simplified Cloud Classification Decision Aid (limited to identifying genera) for Volume I  | Decision Aid Sub-Group: <b>Thurig-Jenzer (lead)</b> , Rae, Campos, Lovell | 1. Develop Decision/Coding Aid<br>2. Develop simplified Identification Aid  | 1. Updated Cloud Coding Decision Aid and Cloud<br>2. Classification Decision Aid               | 1. 80% Dec 2014<br>2. 80% Feb 2015            | 98<br>100   | Do more cartoons need to be developed?   |
| 8.                    | Determine functional requirements for website and design all aspects of the web-based ICA, including the Image Template, all desired functionality, the final formats needed (e.g. various printable subsets), and search requirements | <b>Trice (lead)</b> , Tam   | 1. Document the functional requirements<br>2. Document the text flow structure<br>3. Seek approval to continue from CIMO MG.<br>3. Build test website.  | 1. Specification of functional requirement<br>2. Text flow diagram<br>4. Test Website          | 1. Oct 2015<br>2. Oct 2015<br>4. May 2016     | 20          | Need to allow for testing and debugging here, and it may take considerable time. A review process is required. |
| EXTERNAL REVIEW POINT |  |   |   |  |   |             |  |
| 9.                    | Build the website  | <b>Tam (lead)</b> , Trice   | 1. Do it<br>2. Quantify the cost of operating/maintaining the website once operational.   | 2. Fully functional (offline,) website   | 1. Jun 2016                                   | 0           |  |
| 11.                   | Complete web site functionality  | TBD   |   | 1. Fully functional website  | June 2016                                     |             |  |
| 11a                   | ''Blind user'' Test  |   | Test every page, link and   | 1. List of bugs  | Nov 2016                                      |             | Probably 2 stage. First stage  |

| No. | Task description                                 | Person responsible | Action                       | Deliverable                                     | Deadline for deliv. | Status [%] | Comments   |
|-----|--|--------------------|------------------------------|---|---------------------|------------|--|
|     |  |                    | combination of button clicks |   |                     |            | internal, second stage extensive external betesting. |
| 12. | Final proof-read, error correction, and approval | TBD                |                              | 1. Errors/bugs removed                          | Jan 2017            |            |  |
| 13. | Publication                                      | TBD                |                              | ICA published on web<br>ICA hard copy available | 28 Feb 2017         |            | Re hard copy, need to research this further.         |