WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR INSTRUMENT AND METHODS OF OBSERVATION
OPAG-SURFACE

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STANDARDS FOR AUTOMATED VISUAL AND SUBJECTIVE OBSERVATIONS
Alternative methods for replacing traditional observations that may be not possible to automate

Submitted by Chairman

Summary and Purpose of Document

The document contains an introduction on the requirements for standards of systems measuring present weather.

ACTION PROPOSED

The meeting is invited to take notice information provided in the document and to supply suggestions or recommendations on how to provide documentation and guidelines to standardize present weather observing systems.

References:

1. CIMO-XIII, Abridged final report
2. CIMO MG (2003) Final report
3. EUMETNET Report, Present Weather – Science (E-PWS-SCI*), "Exploratory actions on automatic present weather observations*" (2003), final report with recommendations.

Background

1.1. Introduction

Documents 3(1) and (3) refer to the development of the automatic observing system, in particular to systems developed to automate visual or subjective observations like present weather systems (PWS). It was found, however, that a number of those types of observations couldn't easily be automated by using the new more or less sophisticated technologies, even with multiple-sensor systems in combination with dedicated algorithms. This lack of suitable technologies was recognized by EC-LV: "*4.11 The Council noted that the automation of some manual, visual and subjective observations appeared not to be possible in the foreseeable future. If emphasized, however, that possible alternative methods should be explored for replacing some traditional observations which could then be determined, taking full benefit from technological developments.*" EUMETNET has also recognized this bottleneck in the ongoing development of observation technologies and started the E-PWS-programme trying to solve these issues. In particular the E-PWS-SCI project was carried to find any solutions. A large number of recommendations are stated is the final report[1] of this project for further continuation. In particular two R&D targets are proposed. The first target is related to surface measurements (Improved precipitation detection, discrimination and intensity (range: 0.02 mm/h – 2000 mm/h), with the ability to detect with high accuracy solid precipitation) and the second with upper air measurements: (Cloudiness: classification and amount, to be derived using ground based and satellite remote sensing technologies). This latter target is typically an example of "*replacing some traditional observations, taking full benefit from technological developments."* Although EUMETNET welcomed these R&D targets, no further initiative is taken for continuation of the E-PWS programme.

Clearly, this issue will be one of the most challenging tasks for the community trying to develop observing systems, which can produce the same level of observational data as was provided in the past with manned observations. Especially the evaluation of all possible types of technologies (*in situ* based or using remote sensing) to discover any potential and impact can be identified as a real *task force*.

On the other the functional specifications of the required observational information should be considered thoroughly. It may be concluded that other types of information, which are easier to generate will fulfill the users request as well. In that case further R&D on the automation of the traditional methods can be discontinued. Therefore it is outmost relevant to be aware of the real user requirements of observational data. For example, by tradition cloud cover and types of clouds were reported by an observer situated at a manned station, nowadays, satellite information gives a much more representative overview of these cloud of the area of interest, therefore it is not feasible to develop any ground based cloud cover detection system anymore.

1.2. System development

A number of 'parameters' can hardly be observed automatically today and presumably in future as well (taking into account the state-of-the-art of today's technology and the available financial budgets). By using other data sources and remote sensing techniques some parameters are indirectly derived by estimation assuming a strong correlation between geophysical variables (*e.g.* icing and temperature/humidity). Some weather phenomena, with a very local character, but reported as present weather phenomena, will never be recognized by any instrument. Although the

[1] See http://www.knmi.nl/~meulenvd/eumetnet/E-PWS-Sci/report/PWS-SCI_final_report.pdf

approach to find any solution should be continued we must accept that not all manned, visual or subjective observations can uniquely be replaced by an automatic system. The best approach to find the most appropriate methodology will be based on an integrated observing system (surface, upper air, satellites, etc.) providing all types of observational data and dedicated software to generate information, which is useful for the meteorological community. After reviewing the currently existing techniques and data sources further development will mainly focus on integration of systems and on the development of software.

Activity plan

2.1. Planned activities

In line with CIMO XIII, the CIMO management group has decided to continue the work on standardization of automated visual and subjective observations. Standardization of the measuring technology and algorithms to derive parameters related to this type of observations has to be proposed to CIMO. Furthermore EC-LV stated a clear task towards CIMO on this issue.

To realize these requests, further analysis of the shortcomings of the currently available automatic methods will be carried out. A review of existing technologies will be carried out to discover any potential for further application. Also possible alternative methods for replacing some traditional observations will be explored as well. As a result, recommendations for standards will be developed and published in an IOM report.

2.2. Time Table

	Deliverable	***Deadline***
a.	IOM Report on possible alternative methods for replacing some traditional observations.	February 2006

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