

Hail suppression

- Well-developed glaciogenic seeding technologies have been used operationally in many parts of the world to reduce hail damage. Evaluation of the results has proved difficult and the effectiveness remains controversial.
- Attempts to seed hailstorms with hygroscopic nuclei have been made but have not given demonstrable results.
- Some methods, such as hail cannons or ionization devices, have no physical basis and are not recommended.

Other phenomena

- No confidence can be placed at this time in the use of cloud seeding to reduce the strength of typhoons and tropical storms.
- Attempts to reduce lightning by seeding have not been shown to be effective.

General comments

- The scientific status of weather modification, while steadily improving, still reflects limitations in the detailed understanding of cloud microphysics and precipitation formation, as well as inadequacies in accurate precipitation measurement. Governments and scientific institutions are urged to substantially increase their efforts in basic precipitation research and related programmes in weather modification. Further testing and evaluation of physical concepts and seeding strategies are critically important. The acceptance of weather modification can only be improved by increasing the numbers of well-executed experiments and building the base of positive scientific results.
- Governments and other agencies involved in weather modification activities should invest in relevant education and training.
- Operational weather modification projects should be reviewed periodically, annually if possible, to assess whether the best practices are being used. Any new project should seek advice from experts regarding the benefits to be expected, the risks involved, the optimum techniques to be used and the likely impacts. The advisors should be as detached as possible from the project, so their opinions can be viewed as being unbiased. It is recognized that most weather modification projects are motivated by well-documented requirements, but they also have associated risks and the results may remain uncertain.

ANNEX V

Annex to [paragraph 5.2.1](#) of the general summary

WORKING ARRANGEMENTS BETWEEN THE INTERNATIONAL ORGANIZATION FOR STANDARDIZATION AND THE WORLD METEOROLOGICAL ORGANIZATION

Introduction

The working arrangements concluded with the International Organization for Standardization (ISO) were approved on behalf of the World Meteorological Organization (WMO) by the Executive Council at its sixtieth session in June 2008 and on behalf of the International Organization for Standardization by its the Secretary General _____ on _____ on the basis of ISO Council Resolution 43/2007.

Working arrangements

1. Background

The International Organization for Standardization (ISO) and the World Meteorological Organization (WMO) have been working in close cooperation since the granting of consultative status to ISO by the WMO Executive Committee at its fifth session in 1954.

ISO has recognized WMO as an international standardization body through ISO Council Resolution 43/2007.

These working arrangements between WMO and ISO aim to strengthen the development of International Standards and to avoid duplication of work on standards related to meteorological, climatological, hydrological, marine and related environmental data, products and services.

In the text of these working arrangements the word “standard” is used with the meaning given in ISO/IEC¹ Guide 2:2004, *Standardization and related activities – General vocabulary*. The resulting standards developed under these working arrangements are hereafter called “common standards”.

2. Generalities

The Secretary-General of WMO and the Secretary-General of ISO, with the aim of effectively attaining the objectives set forth in their respective constituent instruments, will act in close cooperation with each other and will consult each other regularly in regard to matters of common interest.

Both organizations agree to keep each other informed on current and planned activities in which there may be mutual interest.

WMO and ISO agree to exchange publications concerning these and related fields.

Suitable arrangements will be made for the participation of each Party to the working arrangements as an observer in those sessions and meetings of the other Party at which matters of common interest are discussed.

3. Scope of application

Subject to their respective rules and procedures, and within the limits of their responsibility and available resources, WMO and ISO will share with each other relevant information regarding their respective work programmes and facilitate active participation and substantive contribution to each other's relevant meetings, appropriate workshops, seminars, working party or expert group meetings addressing standards issues associated with meteorological, climatological, hydrological, marine and related environmental data, products and services.

This cooperation includes and encourages the active participation of WMO as a liaison organization in relevant ISO technical committees (TC) or subcommittees (SC) as well as reciprocal participation by ISO in relevant WMO meetings. It more specifically addresses working arrangements between ISO and WMO in the development of standards and their subsequent publication.

These working arrangements shall apply to the following work items:

- 1) Publications proposed by WMO that are determined by ISO not to fall within the scope of an existing ISO committee. Such proposed WMO publications shall be submitted to the ISO Central Secretariat for consideration by the full ISO membership as indicated below.
- 2) Publications proposed by WMO falling within the scope of ISO/TC 46 (Air quality), ISO/TC 147 (Water quality), ISO/TC 113 (Hydrometry), ISO/TC 180/SC 1 (Solar energy, Climate – Measurement and data) or ISO/TC 211 (Geographic information/Geomatics).

¹ IEC is the International Electrotechnical Commission.

Such proposed WMO publications shall be treated within the work programme of the corresponding ISO technical committee or subcommittee and as indicated in Clause 4.

- 3) Work proposed by ISO or WMO within the scope of the ISO/TCs referred to above, when it has been determined that a new International Standard or other deliverable is required and for which ISO and WMO concur that significant contribution in the development of the standard would be provided by ISO and WMO.

Where it has been determined that a new International Standard or other deliverable is required, and when a WMO publication exists and there is no equivalent or similar ISO standard, the WMO publication shall be taken as the basis for joint work.

4. Standards development and standards adoption modalities

The text of any common standard shall be approved by both Organizations independently.

For the approval of any proposal, there are two possibilities:

- A) Existing WMO publication proposed for approval “as is” by ISO:

A.1) Publication not falling within the scope of an existing ISO committee

WMO, being a recognized international standardizing body as per ISO Council Resolution 43/2007, may propose that a WMO publication (technical regulation, manual, guide or other relevant WMO normative publication) be submitted for vote as a five-month final draft International Standard within ISO (as covered by the ISO/IEC Directives, Annex F, subclause F.2.1.2).

The conditions for approval shall be that not more than one quarter of the total number of votes cast be negative.

If the conditions of approval are met, the document shall progress to the publication stage. If not, the proposal has failed and any further action shall be decided upon by discussion between the WMO Secretariat and the ISO Central Secretariat.

A.2) Publication falling within the scope of an existing ISO committee

WMO may propose that a WMO publication (technical regulation, manual, guide or other relevant WMO normative publication) be submitted for vote as a five-month enquiry draft within ISO (as covered by the ISO/IEC Directives, Annex F, subclause F.2.1.1).

The conditions for approval shall be as specified in 2.6 of the ISO/IEC Directives for an enquiry draft (a two-thirds majority of the votes cast by the P-members of the ISO committee are in favour, and not more than one quarter of the total number of votes cast are negative).

If the conditions of approval are met, the document shall progress to the approval stage (2.7 of the ISO/IEC Directives), that is, be submitted for vote as a two-month final draft International Standard within ISO. If not, the proposal has failed and any further action shall be decided upon by discussion between the relevant WMO body, the WMO Secretariat, the ISO committee to which the proposed publication was attributed, and the ISO Central Secretariat.

- B) Joint development of a standard by WMO and an ISO technical committee or subcommittee

WMO may propose, in agreement with the appropriate ISO technical committee or subcommittee, that a draft WMO publication be submitted for vote as a five-month enquiry draft within that ISO committee, in parallel with the approbation of the responsible WMO technical commission.

The conditions for approval shall be as specified in 2.6 of the ISO/IEC Directives for an enquiry draft (a two-thirds majority of the votes cast by the P-members of the ISO committee are in favour, and not more than one quarter of the total number of votes cast are negative). Comments and negative votes shall be referred to WMO who will take them into consideration in collaboration with the relevant ISO committee.

If the conditions of approval are met, the draft standard shall progress to the approval stage (2.7 of the ISO/IEC Directives), that is, be submitted for vote as a two-month final draft International Standard within ISO and be submitted, in parallel, for approval to the relevant WMO constituent body. If not, the proposal has failed and any further action shall be decided upon by the ISO committee to which the document was attributed with discussion with the WMO Secretariat and the ISO Central Secretariat.

If, for the final draft International Standard, the conditions of approval are met, the document shall progress to the publication stage. If not, the proposal has failed and any further action shall be decided upon by the ISO committee to which the document was attributed with discussion with the relevant WMO body, the WMO Secretariat and the ISO Central Secretariat.

For the above possibilities, the proposal shall be received by the ISO Central Secretariat, which shall take the following actions:

- Assess in consultation with WMO if an ISO technical committee/subcommittee is competent for the subject covered by the proposed document;
- Ascertain that there is no evident contradiction with other International Standards;
- Distribute the proposed document as an enquiry draft (cases A.2 and B) in accordance with the ISO/IEC Directives subclause 2.6.1, or as a final draft International Standard (case A.1) in accordance with F.2.1.2 and F.2.3, indicating (if relevant) the ISO technical committee/subcommittee to the domain of which the proposed document belongs.

The establishment of a new work item aiming at the publication of a common standard shall result from a decision approved both by WMO and by ISO in accordance with their own procedures. A new work item may be proposed by either of the two Organizations and may include a new subject or the revision of existing WMO publications and ISO standards. Once such a decision has been approved, all existing work on similar active projects, within either Organization, should be merged to the harmonized effort. If in the course of its own consultation either WMO or ISO does not approve the new work item proposal, or later any draft being progressed, the other Organization reserves the right to continue to work separately under its normal procedures.

5. Publication

Common standards shall not be published until WMO and ISO have both provided their approval.

The resulting common standards will be published by ISO as ISO deliverables subject to ISO policies and directives and by WMO as WMO publications. Unless otherwise agreed, ISO and WMO will publish two separate documents with identical content.

WMO and ISO agree to identify their respective involvement in the development of a particular common standard and to quote the corresponding standard from the other Organization through such indications in appropriate sections of their respective publication.

6. Copyright

Copyright ownership of publications resulting from the application of these working arrangements will be held by ISO and WMO without payment of royalties to each other. ISO can transfer usual exploitation rights to the ISO member bodies without payment of any royalties to WMO.

7. Maintenance procedures

Revisions to common standards may be proposed at any time by ISO or WMO. Systematic review of common standards shall occur on a period agreed upon between ISO and WMO, which lasts no longer than three years, and after the first review, no longer than every five years.

If no ISO committee was involved during the development of the common standard, the approval procedure set out above shall be repeated if WMO decides that changes to the common standard are required. If an ISO committee was involved during the development of the common standard, its maintenance shall be handled by WMO in consultation with the ISO committee to which the document was attributed.

Common standards shall not be revised without the approval process as described above. The revision of these common standards shall be undertaken only if a parallel investigation conducted within each Organization, according to its own internal procedures, sufficiently demonstrates that problems exist that need to be resolved. In case both Organizations do not reach the same conclusion on the need to revise a common standard, each Organization may decide to revise the common standard unilaterally. In this case the resultant standard shall not be considered as a common standard.

8. Termination

These working arrangements shall enter into force on their approval by both Organizations and shall remain in force unless terminated earlier by either party upon three months' written notice. These working arrangements shall be reviewed on a four-year basis and modified as necessary to enhance the cooperative relationship between the two Organizations.

Annex VI Annex to [paragraph 5.2.3](#) of the general summary

WORKING ARRANGEMENT BETWEEN THE WORLD METEOROLOGICAL ORGANIZATION AND THE INTERNATIONAL ASSOCIATION FOR URBAN CLIMATE

1. The Secretary-General of the World Meteorological Organization (WMO) and the President of the International Association for Urban Climate (IAUC), with a view to facilitating the effective attainment of the objectives set forth in their respective constituent instruments, will act in close cooperation with each other and will consult each other regularly in regard to matters of common interest. In particular, such cooperation and consultation shall be set up for the purpose of effective coordination of activities and procedures arising from the activities of both Organizations.
 2. Both organizations, IAUC and WMO, agree to keep each other informed concerning all programmes of work and projected activities in which there may be mutual interest, and shall exchange publications concerning these and related fields.
 3. Suitable arrangements will be made for the participation of each Party to this working arrangement as an observer in those sessions and meetings of the other Party that relate to items of common interest.
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