

OPAG-WWRP

Weather Modification Progress Report

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Purpose of Document and Major Decision(s) Requested

The following text is a review of main activities in the weather modification field during the period October 2007-October 2008.

An action is recommended to invite Members to contribute to the Weather Modification Trust Fund.

1. INTRODUCTION

Several studies and research related to atmospheric physics and chemistry of clouds have been led in many countries (about 40) to achieve the mitigation of the adverse effects of drought, hail, fog and severe weather related to clouds and precipitation. Many results from weather modification operations have been shown in most of dedicated meetings to illustrate advances in this domain especially in Antalya 22-24 October 2007 during the WMO 9th Quadrennial Scientific Weather Modification Conference as shown in the summary below. A WMO declaration have been revised and adopted during this meeting and a call to create a fund dedicated to support research in this domain have been launched.

2. SUMMARY

The World Meteorological Organization (WMO) is dedicated to the mitigation of the adverse effects of drought, hail, fog and severe weather related to clouds and precipitation. The objective of this conference was to bring together scientific experts in the atmospheric physics and chemistry of clouds with the weather modification research and operations community to exchange scientific findings and views on the latest practices and outcomes of weather modification activities. A three day conference and a one day Forum was kindly hosted by the Meteorological Service of Turkey. The Forum on weather modification research involved five expert presentations and group discussions. On 25 September 2007, the WMO Expert Team on Weather Modification Research met to review the outcome of the meeting and the way forward. The meeting was very successful in (i) assembling the community to exchange experiences, (ii) presenting the decision of Congress XV to establish a Trust Fund for Weather Modification research and (iii) tabling the up-dated WMO Statement on Weather Modification as well as the WMO Guidelines on Weather Modification that were approved by CAS Management Group September 2007. The Expert Team concluded that the large gap that has developed over the past 25 years between cloud physics and chemistry researchers and operational weather modification community needs to be bridged.

3. STATE OF THE ART IN THE WORLDWIDE WEATHER MODIFICATION COMMUNITY

To obtain a picture of the worldwide activities in weather modification and according to Jean Pierre Chalon there was an average of 24 answers per year to register a mean of 68 projects per year since 1984. About 61% of these projects were related to precipitation enhancement or precipitation redistribution, 35% were related to hail suppression and 4% were related to fog dissipation. But the exact numbers of weather modification projects are certainly much higher. Independent inventories have estimated the number of operational projects to be in the order of 200. It is interesting to note that most of the projects were considered by their organisers to be operational, and included insufficient tools to allow a correct evaluation and a better understanding of the seeding impacts.

According to papers presented during the 9th Quadrennial Scientific Conference 50% of them concerned precipitation enhancement activities, 29% on hail suppression, 5% on fog dissipation, about 16% on the development of methods and techniques and only a few papers on inadvertent weather modification. It was notified that there is no scientific review of the papers published in the Preprints to allow worldwide presentation of projects. The papers only represent the opinions of their authors.

Too many projects taking place in the world are designed neither to improve scientific understanding nor to correctly evaluate the consequences of artificial cloud seeding. So the WMO should continue to inform its members on the state of the arts in weather modification techniques and to help them in developing adapted design, research tools and evaluation methods.

4. A TRUST FUND TO SUPPORT WEATHER MODIFICATION RESEARCH AND DEVELOPMENT

There is a necessity to create a WMO fund to support research activities related to weather modification. The purpose of this trust fund as recommended by the WMO congress Cg-XIV is to :

- Encourage research on weather modification, and provide guidance on available scientific knowledge about weather modification,
- Assist Member countries that request advice in practising sound weather modification research,
- Support the organization of the quadrennial WMO Scientific Conferences on Weather Modification, encouraging especially participation of scientists from developing countries and scientists new in the weather modification research,
- Support activities of the WMO Expert Team on Weather Modification (Expert Team Terms of Reference as defined in CAS-XIV).

Weather modification activities in a number of WMO Member countries have been established in order to manage crisis due to drought, improve the economy through increase of water supply, protection agricultural products, etc. or by reducing the risks resulting from high impact weather (frost, fog, hail, etc.). The WMO congress (Cg-XIV) strongly recommended that such activities be supported by research and modelling that provides:

- (a) a deeper understanding of the effects of cloud modification on cloud/precipitation development; and
- (b) a scientifically accepted evaluation of the weather modification activities.

Cg-XIV also encouraged Members to take into account economic, social, ecological and legal aspects when weather modification activities are applied and asked Members and other parties involved in weather modification to contribute to the trust fund.

This fund is based on voluntary participations. Without trust fund it is not possible to perform WM research based on the WMO statement. If the WMO WM statement recommendation is declined, confidence of the decision makers in WM projects will be lost which could lead to reduction or ceasing of modernization of some NMSs in developing countries. The current level of modernization of NMSs of Morocco, Burkina, Senegal and others are to a large extent due to WM projects.

5. Recommendation

It is recommended that WMO Secretariat circulate a letter to Members Permanent Representatives inviting their countries to contribute to TF in supporting activities and projects related to research in weather modification.

Appendix: Terms of Reference of the Weather Modification Trust Fund

TERMS OF REFERENCE FOR WMO WEATHER MODIFICATION RESEARCH TRUST FUND

Purpose of the Fund

1. Encourage research on weather modification, and provide guidance on available scientific knowledge about weather modification.
2. Assist Member countries that request advice in practicing sound weather modification research.
3. Support the organization of the quadrennial WMO Scientific Conference on Weather Modification, encouraging especially participation of scientists from developing countries and scientists new in the weather modification research.
4. Supporting activities of the WMO Expert Team on Weather Modification (Expert Team Terms of Reference defined in CAS-XIV).

Administration of the Fund

5. The Fund will be established from voluntary contributions of WMO Members and other donors.
6. On behalf of the Secretary-General of WMO, the Director of the WMO Department of the Atmospheric Research and Environment Programme shall be responsible for the management of contributions made to the Trust Fund.
7. The Department of the Atmospheric Research and Environment Programme shall administer the Fund in accordance with the WMO Financial Regulations, Standing Instructions and established procedures of WMO, supplemented by the provision of the present terms of reference.
8. The accounting of the expenditures of the Fund shall be as provided for in paragraph 6 above, as well as for any other directly identifiable charges related to the administration of the Fund and programme support cost charges. The support cost charges represent 7 per cent of the directly identifiable charges. The interest accrued from any investment of the principal of the Fund will constitute an income to the Fund.
9. Financial reports on the Fund will be made in Swiss Francs. The United Nations rate of exchange prevailing on the date of the transaction or report will apply for the conversion into Swiss Francs of contributions or income received and payments made or charges incurred in any other currency. WMO shall report to the donors on the use of the Fund on an annual basis.
10. The financial statement of income and expenditure of the Fund will be incorporated in the overall audited financial statements submitted by the Secretary-General of WMO to the WMO Executive Council for approval. External audit will be conducted as provided for in the WMO Financial Regulations. The audit report will be available to contributing partners on request.

Procedures for the utilization of the Fund

11. The utilization of the Fund shall be based upon work plans and budgets determined by WMO, or, in the case of contributions made for specific purpose, as agreed upon between the donor and WMO.
12. The WMO will not enter into any financial commitments unless he has received the funds required.
13. Upon liquidation of the Fund, WMO shall make provision for the payment of unliquidated obligations and estimated expenses of winding-up business.
14. Any remaining surplus after liquidation of the Fund shall be transferred to WMO general accounts unless otherwise agreed with the donors.

Legal responsibilities

15. Under no circumstances will the Fund be made liable to pay and/or reimburse any taxes on emoluments or honorarium, or any customs and import duties, value added taxes or similar charges. If applicable, these will be payable by the beneficiaries of the support provided.

Review of the terms of reference

16. WMO may review the terms of reference in the light of experience gained and make any changes as appropriate.