

WORLD METEOROLOGICAL ORGANIZATION

**SCOPING MEETING ON A POTENTIAL WMO RECOGNITION
MECHANISM FOR CENTENNIAL OBSERVING STATIONS**

11-13 June 2014

Geneva, Switzerland

FINAL DRAFT REPORT

1. Opening

The Scoping Meeting on a Potential WMO Recognition Mechanism for Centennial Observing Stations was formally opened at 09.00 hours on Wednesday, 11 June 2014. On behalf of the Secretary-General of the World Meteorological Organization (WMO), Mr Jeremiah Lengoasa, Deputy Secretary-General, addressed the meeting by emphasizing the key role of observations to underpin climate variability and change-related research and services, but also to enable efficient disaster risk reduction and adaptation strategies. He highlighted the fact that many long-term observing sites are at risk for different reasons and encouraged the meeting to deliver a pragmatic and straightforward recognition mechanism regarding centennial observing stations in order to help Members to protect long-term observing sites.

2. Organisation of the meeting

The meeting agreed to appoint Mr Stuard Goldstraw as its Chairperson. The agenda for the meeting (see Annex 1) was adopted with no revisions. The meeting agreed on its hours of work and other practical arrangements. The list of participants is presented in Annex 2.

3. Centennial observations: Challenges and opportunities

Mr Peer Hechler provided an introductory talk highlighting the importance of long-term observations on the example of the most current 5th IPCC assessment report. Some of the key challenges regarding long-term observations from a climate point of view comprise station closures, changes in instrumentation and observing practices, site relocations, and changes in local site conditions, e.g. through urbanization. Opportunities related to the centennial observations recognition initiative include: (i) provision of strong support to long-term high-quality observations, (ii) promotion of the WMO siting classification as a standardized means for describing and assessing observing conditions, (iii) facilitation of data rescue, and (iv) increase the protection of sites from closure in the future.

Sixty-five Members responded to a WMO survey on centennial observing stations in preparation of the first extraordinary World Meteorological Congress in 2012 and reported 11000 observing sites that had been open for more than 100 years. Some questions about the validity of the source of the data obtained from some Members were raised. However, meeting participants agreed that the questionnaire established an extensive source of information about potential long standing observational stations.

The following aspects were raised in the subsequent discussion: (i) need for improved communication of the importance of long-term observations, (ii) consideration of long-term observing stations, which do not have yet a centennial record, and (iii) time-series data quality aspects.

3.1 Member presentations

The meeting received Member presentations from Guinea; Hong Kong, China; United States of America; Austria; and the United Kingdom. Some relevant aspects presented include: (i) closure of centennial stations due to resource limitations and civil war (Guinea); (ii) need for support to sustain centennial observations and need to better communicate the importance of long-term observations (Guinea); (iii) urbanization effects with limited control over changes in the close surroundings of the observing stations (Hong Kong, China); (iv) management of more than 2000 centennial observing sites with related challenges regarding data rescue including historic metadata (USA); (v) availability of long-term observing records in the Greater Alpine Region and analyses of the more than 250 years temperature record of Kremsmünster (Austria); and (vi) importance of long-term observations for climate monitoring, including extreme event analysis as well as needs for establishing long-term gridded data sets (UK).

In summary, all speakers confirmed that WMO recognition of centennial observing stations can greatly help raising awareness for sustaining long-term observations.

3.2 Update on relevant WMO and GCOS activities

The meeting was informed of topic-relevant activities and views of GCOS, CCI, CIMO, CBS and WIGOS. The following aspects were highlighted in the talks: (i) specification of the aims and goals of the envisaged recognition mechanism to be complementary to existing mechanisms and initiatives (CCI, CIMO, GCOS); (ii) promotion of the importance of metadata and its suitable preparation for appropriate usage may be among the most important benefits of the centennial stations' recognition initiative (GCOS); (iii) need for appropriate consideration of the quality of the observations (CIMO); (iv) promotion of the siting classification (CIMO); (v) establishment of a requirement regarding the 'length of an observational record' in the appropriate GOS regulatory material and in the WIGOS Implementation Plan as well as in the Implementation Plan for Evolution of Global Observing Systems (CBS); and (vi) WIGOS as an opportunity to address and accommodate the mechanism for recognition of centennial observing stations (WIGOS).

4. Technical criteria for a potential WMO recognition of centennial observing stations

Ms Ingeborg Auer and Mr Michel Leroy introduced a proposal for draft criteria for a potential WMO recognition of centennial observing stations. The list of criteria was consolidated as per Annex 3, following an in-depth discussion among participants. Key principles reflected in the consolidated version of the criteria include: (i) considerations to underpin a rather pragmatic and straightforward, yet powerful recognition mechanism; (ii) strategy to put the main focus of the criteria on the observing station, rather than on the respective data products; (iii) intent to be as inclusive as possible and not to discourage Members from maintaining long-term observing

stations by setting criteria too high; (iv) encouragement for data rescue; and (v) consistent application of the CIMO siting classification.

Participants of the meeting agreed to evaluate the usefulness of the criteria by running internal tests with national centennial observing stations (cf. Conclusion 3 below).

5. Towards a WMO recognition mechanism for centennial observing stations

The meeting discussed a proposal presented by the Secretariat, which is mainly based on a self-evaluation by Members for centennial station nominations. The proposal as consolidated by the meeting is attached as Annex 4.

6. Roles and responsibilities

The meeting proposed to ensure support of CCI, CIMO and CBS before, eventually, approaching ICG-WIGOS to accommodate the recognition mechanism of centennial observing stations. ICG-WIGOS was identified as the appropriate potential owning body as the three Technical Commissions mentioned above all have strong interests in the recognition mechanism.

7. Way forward

The following tentative timetable was agreed by the meeting:

Month	Activity
July 2014	Communication of meeting outcomes during CCI-XVI including a specific side event on the propose recognition mechanism for centennial observing stations
	Communication of meeting outcomes during CIMO-XVI including a scheduled discussion during its preceding TECO on siting classification and the propose recognition mechanism for centennial observing stations
September 2014	Communication of meeting outcomes during CBS Ext., reflecting feedbacks from CCI-XVI and CIMO-XVI
September – December 2014	Test of criteria by USA; France; Hong Kong, China; and other Member volunteers (facilitated by WMO Secretariat)
	Meeting participants to draft Terms of Reference for the proposed team under ICG-WIGOS (cf. recommendation 3) (facilitated by WMO Secretariat)
January 2015	Presentation of the proposed recognition mechanism for centennial observing stations at ICG-WIGOS-4 (CCI representative), reflecting Commission responses, results of the test of criteria and above ToRs
May/June 2015	Communication of proposed mechanism during Cg-17

8. Any other business

No further items were raised by the participants.

9. Conclusions and recommendations

The meeting agreed on the following conclusions and recommendations:

- Conclusion 1** CCI, CIMO, CBS, GCOS and Member representatives expressed support to the proposed recognition mechanism for centennial observing stations as a complementary effort regarding long-term observations.
- Conclusion 2** The meeting felt that a similar mechanism might be desirable for observing sites, which are unique in terms of spatial representativeness, such as observing sites at remote places.
- Conclusion 3** The meeting agreed to evaluate the usefulness of the recognition criteria by running application tests with national centennial observing stations. Meeting participants from USA; France; and Hong Kong, China volunteered for such test runs. Other Members are encouraged to join the activity.
- Conclusion 4** The meeting agreed to draft Terms of Reference for the proposed team under ICG-WIGOS (cf. recommendation 3 below), including (i) further specification of the proposed mechanism, and (ii) investigation regarding the inclusion of further criteria into the recognition mechanism as per initial 'Draft criteria for a potential WMO designation of centennial observing stations' by Ingeborg Auer, Austria and Michel Leroy, Météo-France (cf. <http://www.wmo.int/pages/prog/wcp/wcdmp/COS.php>).
- Recommendation 1** CBS to consider reflecting the "length of an observational record" in the Technical Regulations as a criterion for planning and operating observation networks
- Recommendation 2** Members are encouraged to consider centennial observing stations operated outside the NMHS within their nomination submissions
- Recommendation 3** Inviting ICG-WIGOS to consider establishing a team, with representation of CCI, CIMO and CBS, as well as GCOS; to detail, implement, and manage the recognition mechanism
- Recommendation 4** ICG-WIGOS, through the appropriate team as per Recommendation 3 above, to consider investigating collaboration with UNESCO regarding

World Heritage sites in order to certify selected extraordinary observing sites (additional criteria to be developed).

10. Closing

The meeting was closed by its chairperson on Friday, 13 June 2014 at 15.30 hours.

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Original: English

Agenda

1. OPENING
2. ORGANIZATION OF THE MEETING
3. CENTENNIAL OBSERVATIONS: CHALLENGES AND OPPORTUNITIES
 - 3.1 MEMBER PRESENTATIONS
 - 3.2 UPDATE ON RELEVANT WMO AND GCOS ACTIVITIES
4. TECHNICAL CRITERIA FOR A POTENTIAL WMO RECOGNITION OF CENTENNIAL OBSERVING STATIONS
5. TOWARDS A WMO RECOGNITION MECHANISM FOR CENTENNIAL OBSERVING STATIONS
6. ROLES AND RESPONSIBILITIES
7. WAY FORWARD
8. ANY OTHER BUSINESS
9. CONCLUSIONS AND RECOMMENDATIONS
10. CLOSING

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LIST OF PARTICIPANTS

AUSTRIA

Ms Ingeborg Auer
Zentralanstalt für Meteorologie und Geodynamik (ZAMG)
VIENNA
E-mail: ingeborg.auer@zamg.ac.at

FRANCE

Mr Michel Leroy
Météo France
SAINT MANDE
E-mail: michel.leroy@meteo.fr

GUINEA

Mr Alpha Boubacar Barry
Direction Nationale de la Météorologie
CONAKRY
E-mail: barry_ab@yahoo.fr
barryalpha52@hotmail.com

HONG KONG, CHINA

Mr T. C. Lee
Hong Kong Observatory
HONG KONG
E-mail: tlee@hko.gov.hk

SPAIN

Ms Manola Brunet
University Rovira i Virgili
TARRAGONA
E-mail: manola.brunet@urv.cat

UK

Mr Stuart Goldstraw
Met Office
EXETER
E-mail: stuart.goldstraw@metoffice.gov.uk

USA

Mr James L. Zdrojewski
NOAA
SILVER SPRING, MD
E-mail: james.zdrojewski@noaa.gov

WMO Secretariat

Mr Luis Nunes
E-mail: lfnunes@wmo.int

Mr Tim Oakley
E-mail: toakley@wmo.int

Mr Rupa Kumar Kolli
E-mail : rkolli@wmo.int

Mr Omar Baddour
E-mail: obaddour@wmo.int

Mr Peer Hechler
E-mail: phechler@wmo.int

Draft criteria for a WMO recognition of centennial observing stations

Notes:

- (1) The final template for Members' nominations for recognition of centennial observing sites re below established criteria will be in form of a tick list for Members' self-assessment. The template will include space for comments and additional information; such as a list of parameters, for which centennial observations exist, further station information, links to relevant publications (particularly on the use of the station's time series data) etc.*
- (2) Members will be encouraged to maintaining long-term observing stations for future recognition, which meet the above criteria and which do not have yet a centennial history,*

Mandatory criteria:

- (1) The observing station was founded at least 100 years ago, observing at least one meteorological element since then, and is in operation as an observing station at the date of nomination.
- (2) Periods of inactivity of the observing station shall not exceed 10 % during the last 100 years (excluding periods of armed conflicts and natural disasters).
- (3) The minimum historic station metadata shall contain actual or derived geographical coordinates including elevation, identified meteorological element(s) and its unit(s) as well as the observing schedule.
- (4) The observing station has not been subject to known relocations, which have affected the climatological characteristics.
- (5) All historic observational data and metadata are rescued, or will be rescued in order to prevent them from deterioration of the medium (cf. Guidelines on Data Rescue). Members are requested to share information of the amount of data to be rescued including related plans for data rescue, if applicable.
- (6) The observing station shall be operated according to WMO observing standards.
- (7) The environment of a centennial observing station shall be classified according to the siting classification defined in the Guide to Meteorological Instruments and Methods of Observation (WMO No. 8, 2008 edition, 2010 update). Members are requested to share the results of the siting classification for the nomination process and any future re-nomination.
- (8) The observed and measured data shall be subject to routine quality control procedures as per current WMO guidelines and practices. The quality control processes as well as its results shall be well documented.

(9) Members shall do their utmost to maintain nominated stations according to the above recognition criteria.

Desirable criteria:

(a) Free and unrestricted data access [definition cf. Resolution 40 (Cg-XII); http://www.wmo.int/pages/about/Resolution40_en.html], shouldⁱ be granted to the data including respective metadata.

(b) Observing station time series data should be subject to quality control.

(c) Observing station time series should be subject to homogeneity testing and homogenization, if applicable. *Note: Important for any centennial observing station is that the distribution of its observed data allows testing homogeneity and that possible breaks in the series are distributed in a way that the time series can be homogenized. A sufficient number of neighboring stations will facilitate the homogenization procedure. It is fundamental to preserve the original data before any further treatment. In case of homogenization the original as well as the homogenized series shall be stored.*

ⁱ World Meteorological Congress to decide whether access *shall* be granted (and the criterion to be moved to the list of mandatory criteria).

Proposed mechanism for the recognition of centennial observing stations

Aims:

- To raise awareness of existing long-term observations and its importance across WMO programmes, international mechanisms (such as GFCS) and the public;
- To help maintaining, and facilitate planning for, long-term observing sites;
- To promote high quality long-term observations in the future;
- To encourage sharing of long-term time series data including its use for climate variability and change analyses;
- To facilitate the WIGOS ambition and to promote the effective and efficient use of resources, including resource mobilization, to ensure sustainable meteorological observations.

Proposed mechanismⁱ:

- **Send out to Members, on a regular basis, a permanent invitation to apply for WMO recognition of centennial observing stations as per defined criteria;**
Note: The invitation will include the list of recognition criteria to be ticked off by Members for each nominated observing stations. Further, it will include information on the review cycle (e.g. once a year), and it will request nomination of a national focal point including information of his/her official position in the respective organization. Members will be encouraged to include into their applications nominations from observing station operators outside the NMHS.
- **Review of nominations by an appropriate team of Commissions and programmes concerned;**
Note: Team to be established preferably under ICG-WIGOS.
- **Recommendations for formal recognition to be sent to the appropriate constituent body;**
- **Stations to be listed in the WIGOS Information Resource (WIR);**
- **WMO to run, and to keep up-to-date, a special Website as well as a brochure on centennial observing stations including their particular importance, with reference to the above mentioned station list;**
- **Nominations to be renewed every ten years.**