CAS MG-9 Action Items	
Action Item	**Progress**
CAS MG-9 Action Item 1: WWRP to take up the broad water issues on behalf of CAS and wherever relevant, incorporate water fluxes in the science themes of the WWRP Working Groups and projects.	The water topic crosses cut all WG and projects. Specific areas are here considered: 1. The integrated water cycle (atmosphere, ocean, hydrology) in S2S and in CHAMP; 2. The rainfall extremes in HIWeather, in the nowcasting and mesoscale WG and in the Tropical Meteorology WG; 3. The link between the water cycle and the dynamics in the PDEF and DAOS WGs; 4. The verification of precipitation related parameters in the verification WG; 5. The societal value and the economic impact in the SERA WG.
CAS MG-9 Action Item 2: The Chair SSC EPAC to bring to the EPAC SSC the development by GAW of an implementation plan for IG^{3}IS with a long-term strategy and short-term goals, in a 10 years' time horizon following the procedure selected for the development of the PPP and S2S plans by WWRP. CAS MG advised that this process should start with a 2-3 day meeting to discuss ideas and opportunities and that this should be an inclusive process.	The initial steps have been taken. EPAC SSC reviewed the drafting team at the meeting in February 2015. The outline is already drafted. The team is led by Phil DeCola from the USA. The team met in September 2015, December 2015 (at AGU) and has a splinter meeting in April 2016 during EGU. The drafting team developed a concept paper to be presented to EC-68. Several opportunities were used to promote the concept and the team is working of identification of countries where pilot projects can be launched. The success requires development of the funding strategy to support the initiative.
CAS MG-9 Action Item 3: The Chief WWR to set up a dedicated website for WWRP RDPs and FDPs as an information resource on past projects and lessons learnt, procedures for RDPs and FDPs to be considered, future plans etc.	It has been prepared and now and it will be available on line at: https://www.wmo.int/pages/prog/arep/wwrp/new/RDP-FDP.html from 15 April 2015. However WMO web site will be soon restructured and we need to rethink the way we would like to present RDP/FDPs.
CAS MG-9 Action Item 4: The C/WWR to ensure that a clearer focus	This matter has been addressed in the implementation plan of the HIWeather project

and direction for HIWeather be determined at the 2nd HIWeather project workshop during June in the USA in order to clearly set it apart from previous THORPEX activities and to make it attractive and relevant to WMO Members.	which is now available on the WWRP web site, see: https://ww.wmo.int/pages/prog/arep/wwrp/new/documents/HIW_IP_v1_4.pdf .
CAS MG-9 Action Item 5: The Environmental Pollution and Atmospheric Chemistry Scientific Steering Committee (EPAC SSC) to review the GAW structure as to its usefulness and relevance to for instance the demands from services and different application areas.	EPAC SSC had a look at GAW structure at the meeting in February 2015 and recommended to establish more cross-SAG activities related to specific applications. The first meeting of the SAG-Apps will take place in June 2016. The Terms of Reference of the World Data Centers were reviewed at the meeting on GAW Data management in August 2015.
CAS MG-9 Action Item 6: The EPAC SSC to consider and act upon the items (such as defining application areas and requirements for GAW observations, the rolling review of requirements process, growing need for near real-time data availability) proposed by Sandro Fuzzi as member of the ICG-WIGOS while the Secretariat is requested to establish a mechanism for routine interaction between Sandro Fuzzi, EPAC SSC, Scientific Advisory Group (SAG) Chairs and the CAS MG.	The Task Team on Observational Requirements and satellite observations was formed. It met in November 2014 and in August 2015. TT reviewed “atmospheric chemistry” application area and proposed 3 applications to substitute it. TT established the list of variables for each application area. Several SAGs developed requirements in support of the three application areas. Sandro Fuzzi is involved in teleconferences and in person meetings with EPAC SSC and SAGs on agenda items related to WIGOS and RRR.
CAS MG-9 Action Item 7: EPAC SSC to address the local station category issue in their next meeting.	EPC SSC considered category of local stations at both meetings (June 2014 and February 2015). The requirements to this category are developed and they are included in a new GAW Implementation plan.
CAS MG-9 Action Item 8: CAS and WMO in general should work with Members to raise its profile in research funding circles (IGFA, Belmont Forum) in order to maintain and build momentum in atmospheric research and model development across timescales.	1. A round table has been organized during the last WWRP SSC meeting involving NSF, NOAA, the Belmont Forum, and the EU Commission. 2. Moreover, a specific action has been dedicated to the polar regions. A document has been prepared in collaboration with WCRP in order to promote WWRP/WCRP research objectives for the next Horizon2020 calls. The document has been shared with the EU Commission. A preliminary draft of the next

	H2020 calls shows an important change with a specific reference to weather and climate research about high-latitude mid-latitude interactions. 3. Further actions need to be organized specifically towards the establishment of a fund raising plan for the three legacy projects. We should consider that the member's contributions to the three trust funds will be limited in the future. A preliminary discussion with Mary Power (Director: Resource Mobilization Office) has started.
CAS MG-9 Action Item 9: The emerging priorities in the WMO Strategic Plan for 2016-2019 need to be addressed and responded to by EPAC SSC and WWRP SSC.	Both SSCs are considering the WMO priorities, to be approved by Congress, in drafting the GAW and WWRP Implementation Plans.
CAS MG-9 Action Item 10: The review of the WIGOS Manual Volume I and the General standards and recommended practices-documents are left with EPAC SSC to respond to CAS President in order to meet 10 July deadline on behalf of GAW.	This action point is done and closed.
CAS MG Action Item 11: CAS President to keep a file of exceptions on the membership of groups under CAS.	Yes, the CAS President keeps track of exceptions on which he consults with CAS MG members.
CAS MG-9 Recommendations	
Recommendation	**Progress**
CAS MG *recommended* for CAS, through GAW, to push the observational capability on a global scale of aerosols and aerosol properties and ensure that the downstream requirements (atmospheric composition/health, NWP, climate) dictate the specification of observed properties, also through the Rolling Review of Requirements (RRR) process. CAS (GAW) has the responsibility to coordinate	Not much progress has been done in this direction. SAG Aerosols started the process of establishment of user requirements. It continues coordination of network but some obstacles do exist in relation to contributing networks. SSC decided to organize a special workshop to develop terms of reference attractive for contributing network but it has not happened yet. Network harmonization deem very difficult as different network were originally created for

networks, ensure compatibility of data, perform QA and calibration/standardization, managing the observational data, etc. Furthermore, CAS through WWRP and GAW, encouraged to carry out research and development activities to pave the way for applications and use of aerosol information (services).	different purposes, measure different aerosol parameters and user application specific measurement techniques. Philippe Bougeault reminded members of ACTRIS (**A**erosols, **C**louds, and **T**race gases **R**esearch **I**nfra**S**tructure Network), a regional aerosol network in Europe that is of relevance. Oksana Tarasova commented that GAW is well aware of ACTRIS and the Programme is an associated member of the project. Moreover, she mentioned that GAW was represented at the stakeholder meeting dedicated to ACTRIS application for ESFRI roadmap. Deon Terblanche said that the GAW community needs to integrate user needs in their work. Shiv Attri commented that although different aerosol networks were created for different purposes, there are some parameters like AOD (common of all) which could be integrated. Collaboration with contributing networks will be further discussed at the SAG Aerosol which takes place on 30 May-3 June 2016.
The CAS MG *recommended* the establishment of an urban sustainability project, based on integrated weather, climate, water and related environmental services, as a main issue for WMO and cross-cutting for CAS, CBS, GFCS, and services delivery, with CAS to carry the project forward initially. In this initiative, it would be desirable for WMO to put the science and service components together. WWRP and GAW should together bring the urban sustainability issue forward: expand GURME, involve analysis of urban sustainability, modelling capability, how to best interact with the weather community: nowcasting, mesoscale modelling, HiWeather, and S2S.	The scientific plan of HIWeather has been finalized. One of the key topics deal with Urban related hazards (flash floods, air quality, heat waves). Urban issues have also been included as a cross-cutting subject in GFCS by IBCS-2 in 2014. Cg-17 will further consider how best to include urban matters within WMO Programmes and activities.
CAS President highlighted the inter-Commission CAS-CHy-CBS Coupled Hydrology Atmospheric Modelling and	A first teleconference to discuss the CHAMP project was held just before the 2015 CAS MG. Detailed information will be provided during the

Prediction in the Laurentian Great-Lakes-St. Laurence River of North America (CHAMP) RDP/FDP that was discussed and supported at the PTC meeting. The MG *recommended* that WWRP should take the lead on this project on behalf of CAS.	meeting. The teleconference has been organized together with CHy and CBS. It has been proposed to promote the CHAMP project through a new item in the WWRP congress document, where it will be recommended to start with the Great Lakes case study, but to engage other members for new case studies on the coupling between atmosphere and hydrology.
The CAS MG *recommended* for the two working groups (Nowcasting Research and Mesoscale Forecasting Research) to develop a ToR for the merged group and a timeline to implement the merger.	The merging phase will be completed by autumn this year, when the new WG will meet (around 12 members). The President, with the support of the CAS MG in writing, endorses that Jeanette Onvlee and Paul Joe are (co) chairs of WWRP Nowcasting and Mesoscale Research Working (NMR WG) until the end of 2016 and that Estelle de Coning and Peter Steinle take over as co-chairs from 2017, and that all four work together during the transitional period. ToR will be prepared and discussed for the first WG meeting.
Typhoon Landfall Forecast Demonstration Project, Northwest Pacific Tropical Cyclone Ensemble Forecast Project and the South China Monsoon Rainfall Experiment. The said projects resulted in new understanding and methodologies to help answer some problems related to tropical cyclone and monsoon forecasting. The CAS MG *recommended* that the development of similar projects in other tropical cyclone/monsoon affected regions be encouraged by the Working Group on Tropical Meteorological Research.	This recommendation will be taken into account for the organization of the 3rd heavy rainfall workshop.
CAS MG *recommended* that a review of the status on weather modification should ideally be carried out every few years or when new evidence accumulates, and be based on the core budget of WMO, as weather modification is an important issue in many countries.	The Expert Team on Weather Modification met in Thailand from 17 to 19 March supported by the limited remaining balance in the trust fund and reviewed the WMO documents on the subject. These will be finalized for approval by EC-68 in 2016 following endorsement by WWRP and CAS. WMO Members might raise the funding support of the Wx Mod during Congress.

The CAS MG *recommended* that more efforts are required by WMO Members to strengthen aerosol observations in an integrated manner to ensure that such data are made available also in the context of growing near real-time applications.	The topic features prominently in the Congress documents and in the dedicated side event during Congress. Through these efforts CAS and the Secretariat are highlighting the need to strengthen aerosol observation.
CAS MG further *recommended* for the Rolling Review of Requirements (RRR) to become routine in GAW and requested EPAC SSC to give this matter the required attention. Gap analysis should identify the most important gaps first. As these gaps become filled, gaps of second order importance can be identified and filled.	EPAC SSC develops the procedure for inclusion of RRR in the GAW processes.

CAS MG-10 Action Items	
Action Item	**Progress**
ACTION ITEM 1: The CAS Management Group members were requested to familiarize themselves with IG3IS and to ensure that their respective PRs' are well informed and supportive to this initiative, including at the discussions during Congress in May 2015.	The web page for IG3IS initiative was created (http://www.wmo.int/pages/prog/arep/gaw/ghg/IG3IS-info.html). It contains presentations and background materials to explain the tool. The concept paper is also uploaded to the GAW web page and it will be further discussed at the EC-68. Round table in support of the document will take place on 17 June 2016.
ACTION ITEM 2: The CAS Management Group members were requested to familiarize themselves with the role of (the observational component of) GAW within WIGOS and use the opportunities presented by WIGOS in support of CAS initiatives, including IG3IS. In this regard, members were requested to ensure that their respective PRs' are well informed and supportive of WIGOS-GAW links, including at the discussions during Congress in May 2015.	Role of WIGOS and its underlying processes is specified in the GAW Implementation plan, though further actions in the countries are required to foster implementation of WIGOS. Mutual benefits should be sought between upgrades of meteorological observing networks and enhancement of atmospheric composition measurements.

ACTION ITEM 3: A well-coordinated effort is required to ensure sustainable resources to the activities of the WMO Research Department (WCRP, WWRP and GAW) and to ensure that global, regional and national funding organizations are aware of the research opportunities presented. In this regard CAS MG requested for: i. A holistic funding strategy to be developed with contributions from the CAS MG and two SSCs and the secretariat. ii. The CAS Management Group members to ensure that their respective PRs' are reminded of the priorities agreed to by CAS and to be supportive to these initiatives, including the discussions during Congress in May 2015. iii. (Deon Terblanche) Will develop an action list on the funding of projects for Cg-17.	See resource mobilization session under CAS MG 11 agenda.
ACTION ITEM 4: The Chief WWRP has to establish what is being done already in other commissions (CIMO and CBS) and departments of WMO. If a clear gap exists, the WWRP SSC should consider how the Working Group on Nowcasting and Mesoscale Weather Forecasting Research and the Working Group on Data Assimilation and Observing Systems could assist.	CIMO has developed a WMO guidance on weather radar/ wind turbine siting. It is the Annex (page 28) of the chapter 9 in Part II of the current CIMO Guide edition (http://www.wmo.int/pages/prog/www/IMOP/CIMO-Guide.html). This topic has been also considered at the last WMO Congress under the item 4.2.2.65 (Standardization of Weather Radar Practices and Procedures). "CIMO is requested to coordinate scientific studies and work on more specific recommendations on the separation between wind turbines and weather radar systems." The nowcasting and mesoscale numerical weather prediction WG has been established last year with a first meeting held in Geneva (December 2015). It has

	been requested to put this agenda item for their first meeting in Hong Kong, July 2016.