

WORLD METEOROLOGICAL ORGANIZATION

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COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND
PRODUCTS

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THIRD SESSION

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Recent developments in the soil moisture community

(Submitted by Stephen English)

Summary and Purpose of Document

This note reports on the status of the effort, initially led by the land surface community, to organize an International Science Working Group for the Earth's surface.

ACTION PROPOSED

The third session is invited to note the information provided.

DISCUSSION

1. Background

Since 2006 the International TOVS Working Group has had a sub-group on Remote Sensing and Modelling of Surface Properties (RSMSP). This group focuses on the identification of scientific challenges facing surface modelling and ways to improve the use of remote sensing observations in Numerical Weather Prediction (NWP). It has met in 2006, 2009, 2011 and 2016 aiming to bring together scientists working in the fields of remote sensing, modelling of the surface and its radiative properties, and satellite data assimilation. Microwave, infrared, and visible applications have been considered, both in passive and active modes. Topics have included studies of the surface emissivity and temperature of land surfaces, sea ice, open water, snow. The focus has always remained primarily about how to improve the surface to facilitate better use of satellite data whose main purpose is atmospheric analysis.

More details on the latest RSMSP meeting can be found at:

<http://cimss.ssec.wisc.edu/itwg/groups/rtwg/meetings/sfcem/2016/>

At the most recent meeting held in Grenoble in March 2016 it was discussed whether the RSMSP group should continue as a sub-group of ITWG or self-nominate to the Coordinated Group for Meteorological Satellites (CGMS) as a new International Science Working Group. The group concluded that there was a distinct need for a CGMS science group for the earth's surface, as this was not covered fully by existing groups. However the group also concluded that the RSMSP had a distinct role supporting ITWG and should continue, and that a new group was needed.

Gianpaolo Balsamo (ECMWF) and Ben Ruston (NRL) were asked by RSMSP to organise a workshop in Monterrey in July 2017 to discuss the formation of such a group and hold its first meeting. If this event is able to attract a group of scientists adequately representative it could operate along the lines of existing CGMS International Science Working Groups, and then ask CGMS to consider adopting the new group.

2. Formation of an International Surface Working Group

The first meeting of what could become an internationally-recognized Surface Working Group (ISWG) has been organised and a meeting will occur in Monterrey 19-20th July 2017. Registration and submission of abstracts closed on 14th April. The working group meeting will focus on the earth's surface, gathering requirements that are specific to surface monitoring. The initial focus will be on technology that has reached a maturity level to be directly used in surface monitoring and modelling applications and feed into weather and climate. The group intends to be application focussed and will embrace other technologies as they mature.

The meeting topics are listed on the website and included:

- Assimilation of surface sensitive observations: IR/MW, active/passive remote sensing, methods for handling the surface emissivity and spectral temperature; quality control issues and methodology; atmospheric variable sensitivity studies; and observation/background error specification.
- Land surface assimilation schemes: State of the operational land surface modelling systems and recent developments; sensitivity studies of surface model parameters to remotely sensed data; outcomes of SMOS, GPM, SMAP missions; calibration issues, variable transforms or PDF matching techniques
- Radiative transfer developments and emissivity/reflectivity models: VIS/IR/MW, all surface types, review of current available parameterization for forward modelling the surface boundary for remotely sensed data; description of available land emissivity databases/atlas (MW and IR); intercomparison/validation of physical models and retrieved emissivities (MW and IR, including land, ocean, and ice surfaces).
- Retrievals of surface parameters: land surface temperature, soil moisture, snow water equivalent, water-body extent, sea surface wind, salinity, canopy parameters, vegetation water

- content, sea-ice concentration, etc. and the resulting surface emissivity/reflectance spectra.
- Other relevant topics: model-data comparison efforts involving EO dataset and shared experiences from ongoing surface monitoring systems including their infrastructure will be providing context for discussing and reviewing the existing capabilities.

For more details see the website:

<http://cimss.ssec.wisc.edu/iswg/meetings/2017/>

The process of recognizing this working group by WMO and CGMS needs further discussion. Relationship to efforts by the soil moisture community to get organized internationally¹, following the example of the other five International Science Working Groups (ITWG etc.), need to be defined.

¹ 4th Satellite Soil Moisture Validation and Application Workshop and the CCI Soil Moisture User Workshop, Vienna, Austria, 18-20 Sep 2017 <http://smw.geo.tuwien.ac.at/>