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IESWG status and plans including key recommendations to CGMS plenary

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Satellite data and products – WG II

Coordination Group for Meteorological Satellites

CGMS

Executive Summary

Within CGMS, IESWG provides the community representation of experts on land surface processes and data assimilation.

The WG's interests are strongly driven by the need and underutilised opportunities to broaden earth surface data assimilation and furthering land modelling developments with a view of the role of Earth surfaces at higher model resolutions.

This is to be achieved by extending the exploitation of existing and future earth observation capabilities beyond their primary purpose.

Executive Summary

IESWG focusses on three topical areas:

- Snow ice and cryosphere interactions;
- Vegetation and land-atmosphere fluxes;
- Soil moisture, river discharge, and the general water cycle.

This provides complementarity with the following established CGMS and its WGs:

- Wider exploitation of existing observational capabilities and capacities (WIGOS);
- Utilisation of precipitation and snow observations developed within IPWG;
- Closing the DA gap together with ITWG-NWP, which focusses on atmospheric DA;
- Providing enhanced land surface states for ITWG-RTSP algorithms;
- An active bridge with the interests within CGMS-CEOS's WGClimate.

Recent Achievements

Since the initiation of IESWG as a CGMS working group in late 2023, substantial progress has been achieved to formalize our structure, goals, and activities

We are preparing for the upcoming 6th IESWG Meeting, from 11-13 June 2025 hosted by DWD in Offenbach, Germany.

- Expecting 100+ attendees (remote & in person) from national NWP agencies and the hydrology / land surface research community
- Sent a survey to the national NWP agencies reviewing land observation usage in NWP, including identification of significant gaps in the land observation record and user requirements for filling those gaps
    - Results to be summarised at the IESWG meeting
- A second goal of this meeting will be to generate recommendations on how land observation needs might change due to acceleration of AI/ML within NWP

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Recent Achievements

A workshop was held on ancillary/background fields for land modelling with participation of a range of agencies. Findings included

- Requirement for more information on product validation data
- Need for more frequent updates
- Closer communication between modelling/DA and EO will lead to more targeted products

Both Level 1 and Level 2 products are required into the future, with more products made available

- Level 1 data become increasingly relevant in DA
- Level 2 products are required for model development, calibration, and evaluation

Recent Achievements

We have previously identified (near-)global remotely sensed Snow Water Equivalent observations as the most significant land observation data gap, in terms of potential to improve NWP forecasts

- Gathering input from the community, including from the GCW/RRR : Global Cryosphere Watch (GCW) – WMO Rolling Review of Requirements (RRR) for Terrestrial Snow Observation Workshop, from 10 to 12 June 2025.
- We note that the Canadian TSMM has completed mission formulation, including the policy narrative, technical design, science and algorithm definition, and end-to-end costing. Aim is to launch the mission by 2033, dependent on budgetary outcomes.

Additionally, we identify the ongoing continuity of microwave L-band observations relevant for sensing soil moisture, as a future need to ensure NWP forecast quality

Future Activities

Following the 6th IESWG Meeting in June, a Working Paper will be prepared reviewing:

- Current usage of land surface observations in NWP systems
- Future planned usage of NWP observations in NWP systems
- Gaps in the land surface observation record that are hindering progress and/or forecast skill
  - Review community efforts to set user requirements for these gaps
- How AI/ML developments may affect the land observation needs for NWP
- Mapping of priority collaborations with other CGMS WGs

To be considered by CGMS

Confirmation of IESWG as a WG within WGII