

Observational Campaigns for Better Weather Forecasts

Discussion Summary

- **How the NWP community can foster the impact of field studies on NWP**
 - The 'observations community'/instrument developers need guidance from NWP developers of what to measure, what new measurements are needed, and more generally to advocate for what are the research priorities which could be addressed through new observational efforts
 - We feel the WGNE systematic bias survey is an excellent start, but does not focus on how new field observations could add value to the model development process
 - **Recommendation:** The community recommends that ECMWF articulates (at most) a few model physics development goals and systematic errors, that it would like to address, and provides leadership to the broader research community in developing research plans and activities (including measurement initiatives) that do so.
 - For example, data assimilation tools and related diagnostics can be a useful way of diagnosing model and observational errors.

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- **Sharing of tools, data, and best practices among campaigns**
 - **Recommendation:** Central repository at ECMWF for flight campaign tools (e.g., mission support system, trajectories), model diagnostics, and it would be desirable to have an interactive capability and a capability that operates through an interface (minimizing the need to download model data)
 - **Recommendation:** Make available an archive of daily assimilated observation plots
 - **Recommendation:** Observationalists share information regarding upcoming and proposed field campaigns relevant for ECMWF on a shared calendar (hosted at ECMWF)
 - **Recommendation:** Increase interactions and feedback between relevant observationlists/field campaigns and ECMWF with specific points of contact (including data services and science contacts) (such as data.services@ecmwf.int).

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- **Data and discoverability**

- Finding relevant field data is challenging even if it is open and archived.
- **Recommendation:** Form a working group focused on best practices on organization of data across field campaigns to maximize its effectiveness to NWP. Is OSCAR a starting point?
- **Recommendation:** Encourage observational datasets to be published in data journals
- **Recommendation:** Make friends with the appropriate person at target center or researcher. Sustained collaborative efforts are needed.
- It can be valuable to compare nonstandard data products (trace gases, radar) with models, particularly as NWP models evolve to earth system models. In many cases forward models exist in the NWP and process modeling community.

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- **Concrete examples of model improvements based on past field campaigns**
 - ECMWF has made good progress on marine boundary layer mixed-layer clouds through sustained interactions with observationalists and process modelers
 - Measurements from gravity wave field programs have led to new and improved orographic drag parameterizations
 - **Recommendation:** Publish a BAMS article focused on past successes of transitioning observations to model development (perhaps multiple centers)
- **Supersites**
 - The NWP centers find supersite observations to be very valuable for process-level evaluation of models and complementary to more intense and short-term field campaigns