GABLS Report for the GEWEX SSG Meeting

Full Panel, Project or Working Group Name (Acronym): GEWEX Atmospheric Boundary Layer Study (GABLS)
Reporting Period: 2016
Starting date: 2003
End date (where appropriate): N/A
URL: http://www.gewex.org/panels/global-atmospheric-system-studies-panel/gass-projects/
Chair(s) and term dates: Gunilla Svensson and Bert Holtslag

1. During 2016, the GABLS4 (or "DICE-over-ICE") SCM and LES case results were reported at the AMS BLT meeting in Salt Lake City. New setup for the GABLS4 SCM and LES experiments was distributed. The outcome of Larcform1 was published in JAMES (Pithan et al., 2016). GABLS4 led by Eric Bazile, Fleur Couvreux, Patrick Le Moigne (Météo-France).
2. Discussions on the continuation of Larcform have been initiated.
3. A GABLS4 LES workshop day will be held in Delft in March 2017. Another workshop discussing future Larcform and GABLS cases will be held during 2017 also as a WWRP PPP YOPP activity.
4. Larcform1 showed that a Lagrangian SCM framework is capable of capturing the air mass transition to arctic air. Model deficiencies are caused by mixed-phase microphysics, process interaction and surface representation. The GABLS4 more idealized SCM simulations show more consistency with tower observations than running with model specific surface properties (e.g. surface roughness and albedo) and the LES results show relative good agreement during convective conditions and large differences during night that likely are related to the subgrid scale schemes.
5. There is a lack of air mass-following observations to tighter constrain the SCM for the Larcform1 case.
6. The projects contribute to identifying model deficiencies and to aid in parameterization development.
7. The GABLS focus on stable boundary layers and interactions with snow and ice surfaces has the potential of improving models so that they better are able to predict the boundary layer and surface fluxes of heat, moisture and momentum. Improved models concerning the surface interaction has the potential to contribute to many of the GEWEX Science Questions that rely on model applications.
8. Continue to study the atmosphere – surface interactions in cold climates.
9. Our activities have the potential to contribute to science in:
   - Cryosphere response to climate change (including ice sheets, water resources, permafrost and carbon)
   - Improved understanding of the interactions of clouds, aerosols, precipitation, and radiation and their contributions to climate sensitivity
   - Science underpinning the prediction and attribution of extreme events
10. Through the Year of Polar Prediction (YOPP) there is cooperation with WCRP PCPI within CliC.
11. N/A
12. The WWRP PPP/ WCRP PCPI and Bolin Center PhD spring-course on Polar Prediction that was held in Abisko, 5-15 April 2016, used GABLS cases for teaching about polar processes, see Day et al., (2016).
13. Workshops/meetings held
14. Workshops/meetings planned. Include travel support needs anticipated (for WCRP).
    Include tentative meetings planned for up to 2 years (for IGPO planning purposes)
15. Pre-YOPP workshops on Arctic Observations and the Modeling Component, 5-7 September, Reading, UK.
16. It is a bit confusing about where GABLS fit in the current organization with the uncertainty about GASS.
17. Pithan, F., A. Ackerman, W. Angevine, K. Hartung, L. Ickes, M. Kelley, B. Medeiros, I. Sandu, G.-J. Steeneveld, H. A. M. Sterk, G. Svensson, P. A. Vaillancourt and A. Zadra, 2016: Strengths and biases of models in representing the Arctic winter boundary layer - the Larcform 1 single column model intercomparison. *Journal of Advances in Modeling Earth Systems*. DOI:10.1002/2016MS000630

Day J., G. Svensson, I. Brooks, C. Bitz, L. Broman, G. Carver, M. Chevallier, H. Gossling, K. Hartung, T. Jung, J Kay, E. Kolstad, D. Perovich, J. Screen, S. Siemen and F. Vana, 2016: The Abisko Polar Prediction School. *Bulletin of the American Meteorological Society*. DOI: http://dx.doi.org/10.1175/BAMS-D-16-0119.1

18. A GABLS4 LES workshop day will be held in Delft in March 2017. Another workshop discussing future Larcform and GABLS cases will be held during 2017 (at NCAR during spring/summer or in Sweden during autumn) also as a WWRP PPP YOPP activity. Support request for these workshops have already been sent in to GEWEX office.
19. N/A