Agenda - Workshop on snow data assimilation and working group meeting of WG3, March, 8/9, 2017, Offenbach, Germany

Registered Attendees

1. Helmert, Jürgen, DWD, Germany
2. Lange, Martin, DWD, Germany
3. Marcucci, Francesca, COMET, Italy
4. Bettems, Jean-Marie, MeteoSwiss, Switzerland
5. Dong, Jiarui, NOAA/NCEP/EMC, United States
6. Milelli, Massimo, ARPA Piemonte, Italy
7. Koch, Roland, ZAMG, Austria
8. Rozinkina, Inna, Hydrometcenter of Russia, Russian Federation
9. Souverijns, Niels, KU Leuven, Belgium
10. Kurzeneva, Ekaterina, FMI, Finland
11. Samuelsson, Patrick ; SMHI, Sweden
12. Böhm, Uwe, DWD, Germany
13. De Michele, Carlo, Politecnico di Milano, Italy
14. de Rosnay, Patricia ; ECMWF, United Kingdom
15. Gustafsson, David, SMHI, Sweden
16. Trentmann, Jörg, DWD, Germany
17. Bartik, Martin, Slovakia
18. Müller, Richard, DWD, Germany
19. Osuch, Marzena, Institute of Geophysics Polish Academy of Sciences, Poland
20. Churulin, Evgeniy, Hydrometcenter of Russia, Russian Federation

Goals

Of particular relevance for this workshop are presentations on:

- Data assimilation methods and use of snow observations
- Snow observations and evaluation
- Snow observations and models
- Snow observations and hydrological models

with discussions on

- Methods for combining satellite observations with conventional in-situ snow measurements and modeling results
- Spatial and temporal representativeness errors of snow measurements for data assimilation in NWP and hydrological models".

Organisational issues

The workshop starts on March, 8 after Lunch, 13:00 at the meeting point of the COSMO / CLM / ICON / ART - User Seminar in the Headquarter of DWD (Frankfurter Str. 135, Offenbach, Germany, 50.103357N, 8.747896E) . A description, how to find the DWD is given here: http://www.dwd.de/SharedDocs/downloads/EN/anfahrtsskizzen/zentrale_offenbach_en.pdf?__blob=publicationFile&v=5

When you arrive in Frankfurt Airport, please take the suburban rail service (S-Bahn, lines S8 and S9, directions Hanau, Offenbach-Ost) to the S-Bahn station Offenbach-Ledermuseum. Information on public transport you will find here: https://www.rmv.de/en/

There is the possibility to get a lunch before the workshop in the DWD canteen (own costs).

Agenda

Please note: Please adapt your presentation time to allow for 10 min open floor discussion after each scientific presentation.

March, 8, 2017

13:30 J. Helmert et al: Welcome (PDF-Presentation)

Data assimilation methods and use of snow observations

- 13:45 J. Dong et al. (invited): Assimilation of the AFWA Snow Depth Product into NCEP Operational CFS/GFS System (PDF-Presentation)
- 14:30 P. de Rosnay et al.: Snow data assimilation for Numerical Weather Prediction
- 15:00 D. Gustafsson et al.: Assimilation of in-situ and satellite snow data for hydrological forecasting in Sweden - a hydropower case study

- 15:30 E. Kuzmina et al., E.Churulin: Experience of preoperational runs for winter 2016/17 of SNOWE- technology for continuous modelling (from synoptical observations) and for initialisation for COSMO runs of SWE values (PDF-Presentation)

Coffee Break

Snow observations and evaluation

- 16:15 M. Lange: Monitoring of snow reporting practice
- 16:45 E. Kurzeneva et al.: Evaluation of remote sensing snow observations for perspective of DA in NWP (PDF-Presentation)
- 17:15 R. Müller et al.: Brief discussion of IMS and LSA-SAF products (PDF-Presentation)
- 17:45 J. Trentmann et al.: Evaluation of satellite-based snow coverage information with surface observations (PDF-Presentation)
- 18:15 A. Gossart et al., N. Souverijns: Blowing snow detection: a comparison of satellite imagery with ground-based remote sensing observations at Princess Elisabeth Station, East Antarctica (PDF-Presentation)

Social - Dinner (own costs)

We reserved a table for 20 persons 19:30 in Münch's Restaurant

March, 9, 2017

Snow observations and models

- 9:00 C. De Michele and Da Ronco, P. : The role of topography in snow cover distribution over a regional scale: evidences from Aqua/Terra MODIS and RCM snow cover simulations (cancelled)
- 9:30 R. Koch and Olefs, M.: Impact of MODIS snow cover fraction on modeled SNOWGRID quantities (PDF-Presentation)
- 10:00 U. Böhm et al.:Combining Ground-based and Remote Sensing Snow Observations within the Model SNOW4 (PDF-Presentation)
- 10:30 Discussion

Coffee Break

Snow observations and hydrological models

- 11:15 M Bartik and Satala, T.: Snow observations in forested mountain areas (PDF-Presentation)
- 11:45 M. Osuch et al.: Analysis of applicability of the HBV model for arctic unglaciated catchment (PDF-Presentation)
- 12:15 Discussion

Final discussion of the workshop

- 12:30 Final discussion and closing

Lunch (own costs)

COST ES1404 - Meeting of the working group 3

13:30 Discussion of WG3 tasks

15:00 Closing of the WG3 meeting

Workshop Meeting Notes

Summary

Data assimilation methods and use of snow observations

- Using satellite data products (e.g., IMS) to force land-surface models with NASA LIS (integrated modeling and DA framework)
- Improve snow depth reports availability on the GTS using WMO GCW and COST Harmosnow ressources
- Combined assimilation of both types of observations, in situ snow depth and IMS snow cover, significantly improves near surface weather parameter forecasts
- Assimilation of snow information can improve spring melt forecasts in hydrological models (manual observations of snow water equivalent and satellite based data on fractional snow cover area are mainly useful)
- Mountainous area are problematic: sparse manual snow observations combined with uncertainties in satellite data
- SNOWE technology at SYNOP stations considers history of snow pack for initialisation of COSMO forecasts

Snow observations and evaluation

- Monitoring of snow reporting practices - allows trace back of potential model forcast quality changes. Permanent task and with long-term record valuable for reanalysis and climatological investigations

- Satellite based snow extent as categorical variable (yes/no), observational error of snow extent, how to combine snow extent from different satellites
- Using spectral fingerprint of snow to detect snow from space, Channels for NDVI are suitable for detection of snow, combination of satellite products (IMS, LSA-SAF)
- Using long-term records of satellite data - retrieve snow information (CryoClim, IMS, Heliosat/HelSnow)
- Combination of ground-based remote sensing by ceilometer with space-born CALIPSO and satellite imagery for blowing snow events

Discussion:

- Several presentations addressed methods for combining in situ and satellite data.
- Future of snow DA: on the long term to use radiances.

Snow observations and models

- Forcing high-res snow models with additional satellite data - sensitivity on snow extent thresholds
- Long analysis phase (past 30h) for Snow4 model, combination with remote sensing data to estimate the spatial structure of the snow cover in regions with sparse or no surface observations

Discussion:

- Problems in snow analysis related to DA: wrong water budget if correction for snow melting issues in the model is applied
- Combined snow and soil moisture DA is useful to keep consistency in the water budget.
- Observation errors: Relationship between MODIS snow product errors and temperature (J. Dong et al.,2014,http://dx.doi.org/10.1175/JHM-D-13-060.1)

Snow observations and hydrological models

- Main factors influencing SWE in forest are vegetation type and state, altitude, exposition for example
- Consideration of vegetation effects on snow could improve forecast of water supply in catchment areas with forests
- Research station data Svalbard: long-term measurements, HBV hydrological simulations, sensitvity of data time step and data averaging on model results
- Investigating the seasonality of snow in western Spitsbergen (4 stations) - analysis of potential sources of change in snow depth

Final Discussion:

- Contributions covered different scales in space and time
- Common methods and objectives/challenges exist to combine in situ and satellite data
- Overall a very instructive workshop for all participants
- Good variety of presentation - Discussion of processes and data assimilation methods.
- Would be useful to have more combined products retrieval approaches.
- Useful also for persons starting to be interested in DA.
- Flow dependent approaches are also useful.
- The format of the workshop is very good with 30 min time slots so that in depth presentations were given.
- It would be useful to have continuity of this collaboration beyond the COST action.

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WG3 Meeting Notes

Discussion items

Task 3.1 overview of various snow observations and data assimilation methods used in NWP, hydrology, and climate studies.

- An overview publication on snow observations used for diversity of application would be useful – as seen in this workshop.
- We should see what was done in SnowMIP2 who already did similar comparison. It would be more relevant to do the overview from the satellite requirement point of view than from the model point of view.
- Difficulty to link snow depth to snow cover and snow water equivalent. The information that we can add here compared to what was done before, is how do we extract the equivalent information to link it to the observation.

Task 3.2 Finding methods to combine satellite observations to in situ data.

- In this workshop we addressed how to use snow cover from different sources.

Task 3.3 Strategies toward more extended usage of conventional snow observations

- Within this COST action several partners have developed a snow observation smonitoring system (DWD, ECMWF, SMHI).
- They provide complementary monitoring tools, some are at the station location or gridded ; interactive (SMHI and DWD).
- DWD and SMHI will see if there is a possibility to make it available for this group.
- The ECMWF monitoring is publicly available.

- Within the Imprex project there are resources to compare snow analysis products.

Task 3.4 Observation errors

- Several contributions of the workshop addressed the problem of the spatial and temporal representativeness errors of snow measurements for data assimilation in NWP and hydrological models