

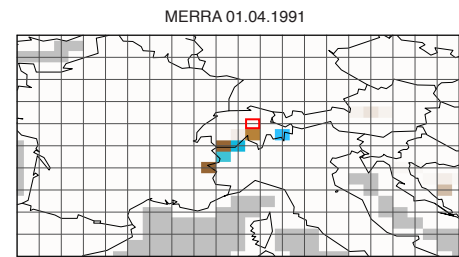
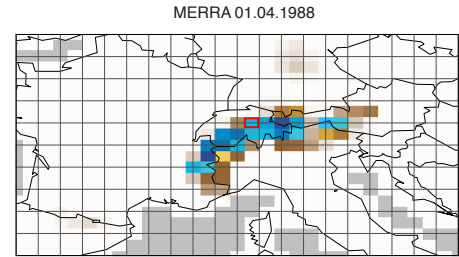
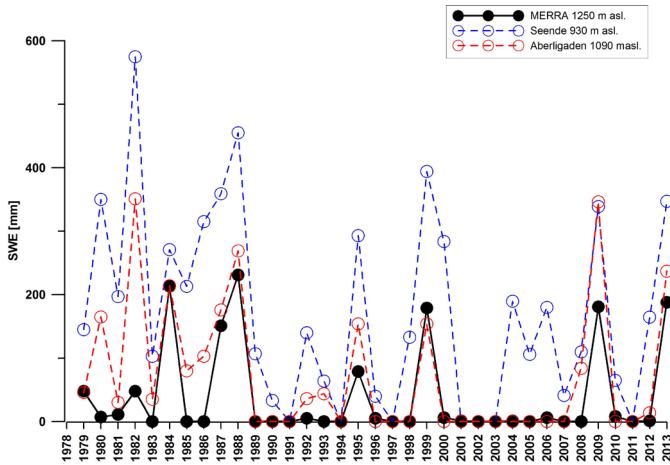
Modelling versus Measurements:

The importance of ground information

Modern modelling systems like GMAO MERRA reanalysis allow the simulation of the snowcover of bygone days and years. As shown below, in some cases these modellings agree reasonably well with ground truth (e.g. 1984, 1988 and 1999). Extreme underestimation of snow water equivalent (SWE) - especially after a sunny March where these influences play a crucial role - results from the lack of the consideration of the shadowing of mountains, as in the years 1982, 1985, 1995 and 2009.

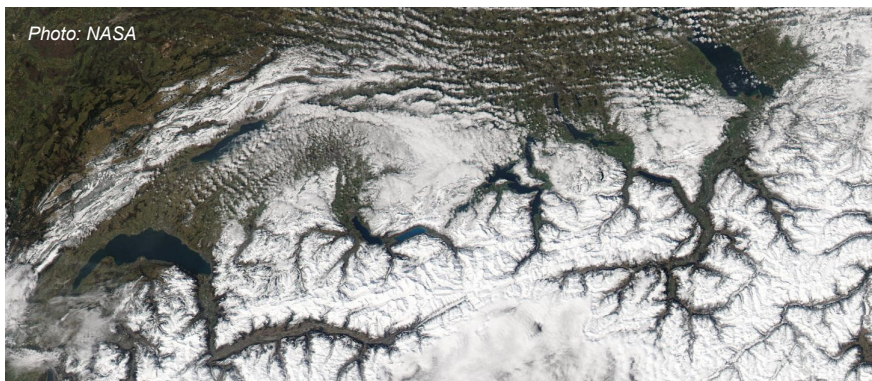
This evidence shows once more the importance of in-situ water equivalent measurements as part of the Global Climate Observing System (GCOS).

Data: NASA and Meteodat (collected by Meteodat, funded by the Federal Office of Meteorology and Climatology MeteoSwiss in the context of GCOS Switzerland)



Modelling of the snow water equivalent (SWE) of the snowcover at the Wägital (1st of April), Switzerland, using the GMAO MERRA 30-year reanalysis (black dots). Blue and red dots show the field measurements at two measuring points at two different sea levels.

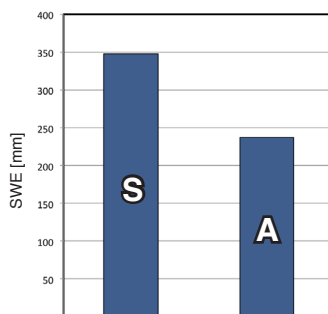
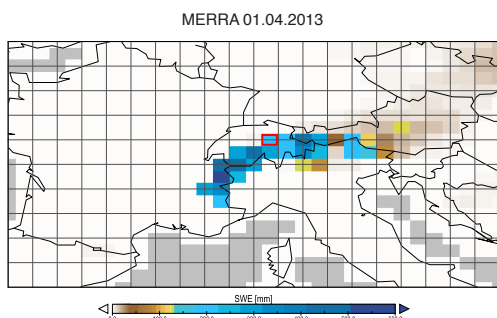
Results of GMAO MERRA of SWE for both snowy 1988 and 1991 with little snow (1st of April). The gridpoint for Wägital is red framed.



MODIS AQUA Image of Switzerland, 1st of April 2013

The NASA-satellite image at the left shows the situation in the Alpine region in springtime 2013. The MERRA-Simulation for the according times shown below (left) fits reasonably but there is a uncertainty about the real values of SWE due to large spatial variability.

The selected two observation sites (right) show the measurements at a very sunny point (Aberligaden) and a quite shady location (Seende) at the Wägital, Central Switzerland (1st of April 2013).



Results of GMAO MERRA of SWE for 2013 (1st of April). The gridpoint for Wägital is red framed.

Two observation sites in the Wägital (1st of April 2013):
S: Seende (930 m a.s.l.)
A: Aberligaden (1080 m a.s.l.)

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