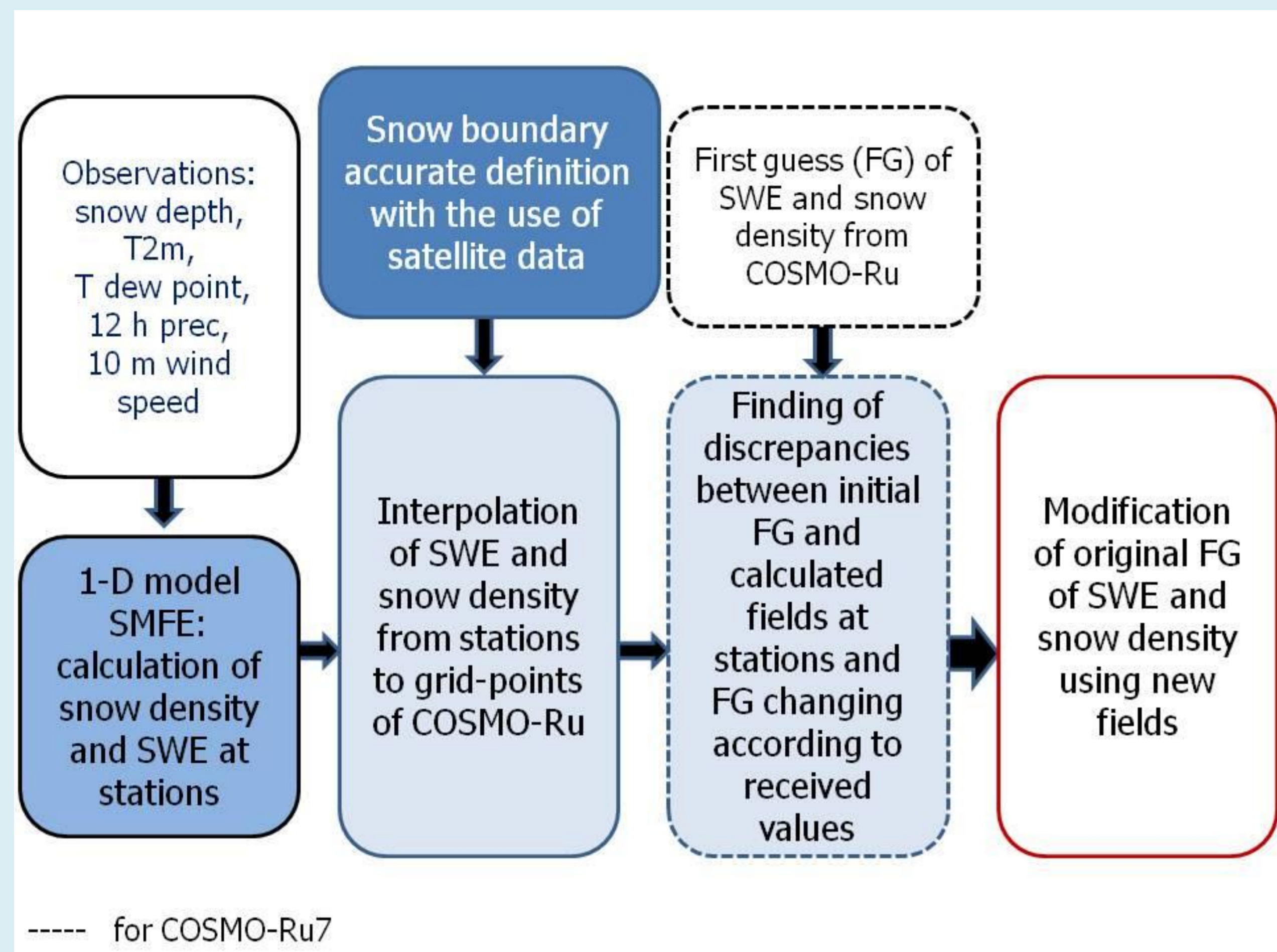# Calculation of initial values of Snow Water Equivalent and Snow Density for COSMO-Ru: quasi-operational technology and first results

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----- for COSMO-Ru7

The main features of the quasi-operational technology

- Daily calculation of snow characteristics (SWE and snow density) at stations started since 1 September 2014
- We selected stations which have more then 4 observations per day and make snow depth measurements:
  436 – for COSMO-Ru2, 2296 - for COSMO-Ru7
- Before calculation of snow fields primary data quality control was carried out (T2m, dew point temperature, snow depth)
- FG of snow fields were not modified for mountain regions (higher than 500 m) and water areas (fr_land<0.5) in COSMO-model
- If there are zones free of snow in COSMO-model initial field (and according to SMFE they are covered with snow), it is supposed to consider them snowless
- Technology began to work quasi-operationally in November 2014. Forecasts were collected since 1 December 2014 for 00 UTC start
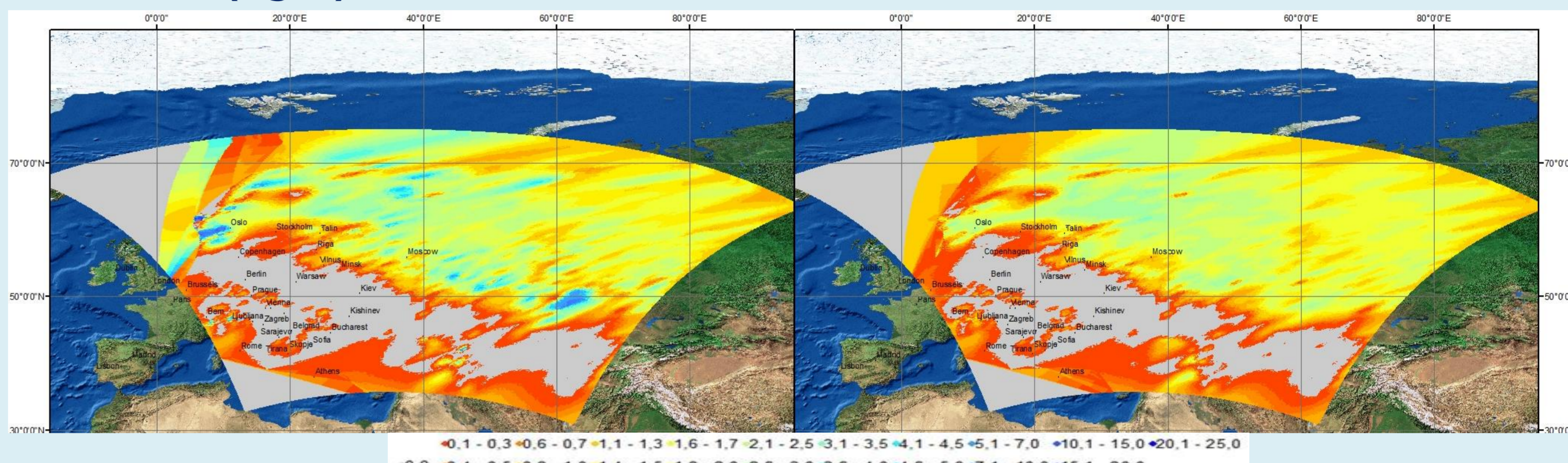
SWE fields. 20 January 2015

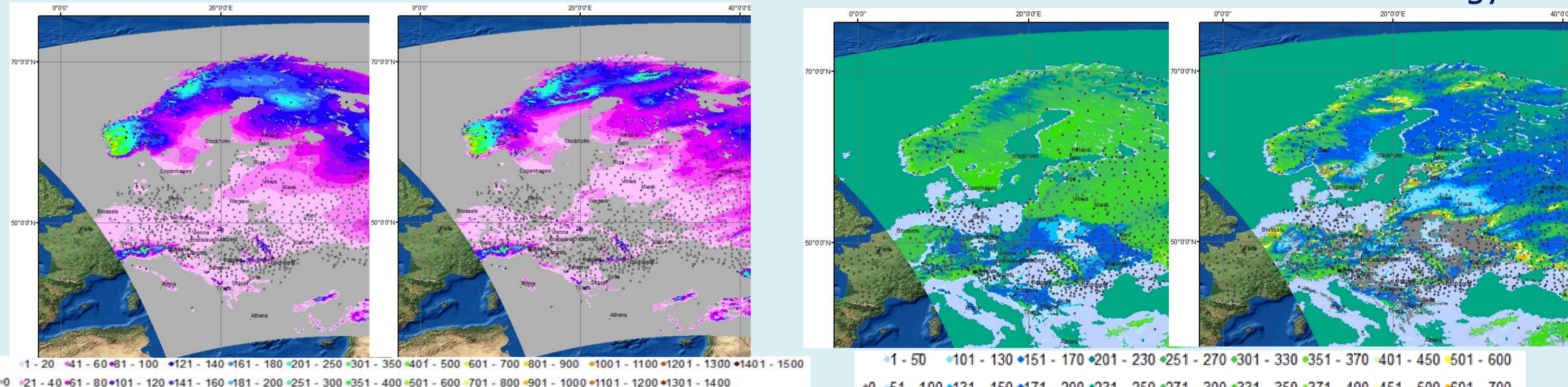COSMO-Ru7 SWE initial field
reference   new technology

SWE measurements

Satellite image from the Research Center "Planeta". 1 February 2015
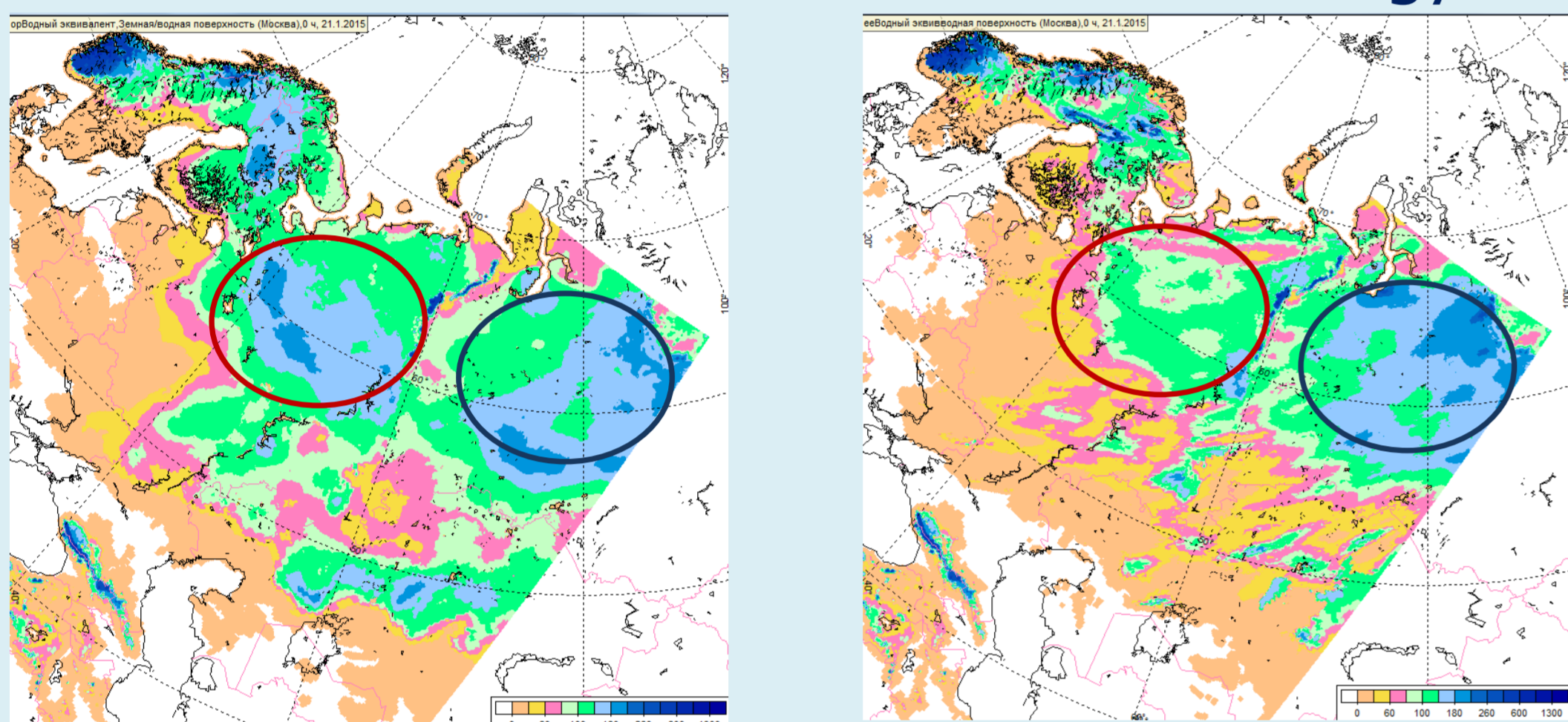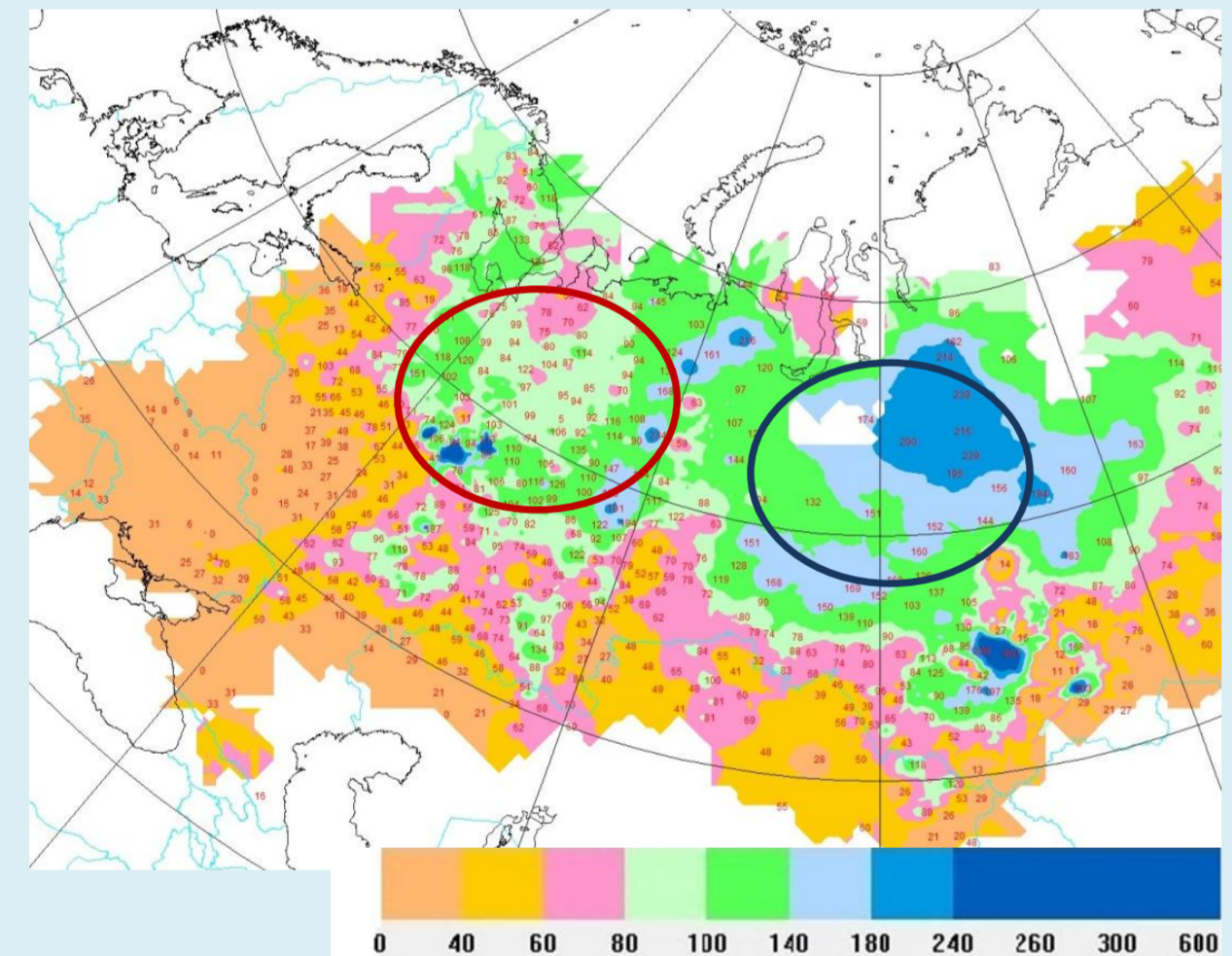
Interpolated discrepancies between COSMO-Ru7 initial SWE (left) and RHO (right) fields and SMFE calculations. 26 December 2014
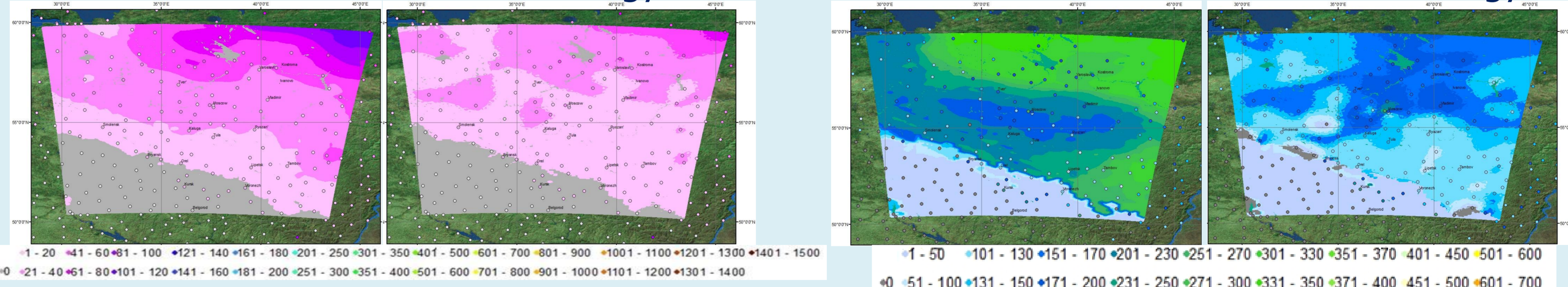

COSMO-Ru7 SWE (left) and RHO (right) initial fields. 26 January 2015
reference   new technology   reference   new technology

Station SWE and RHO values calculated by the snow model SMFE are shown in circles

COSMO-Ru2 SWE (left) and RHO (right) initial fields. 26 December 2014
reference   new technology   reference   new technology

Station SWE and RHO values calculated by the snow model SMFE are shown in circles

COSMO-Ru7 and COSMO-Ru2 verification
COSMO-Ru7 (large domain)

COSMO-Ru2 (small domain)

The main effects from the changing snow initial fields are observed in T2m, surface albedo, cloudiness, 10m wind speed and heat fluxes. But the areas with changes of parameters are fragmentary.
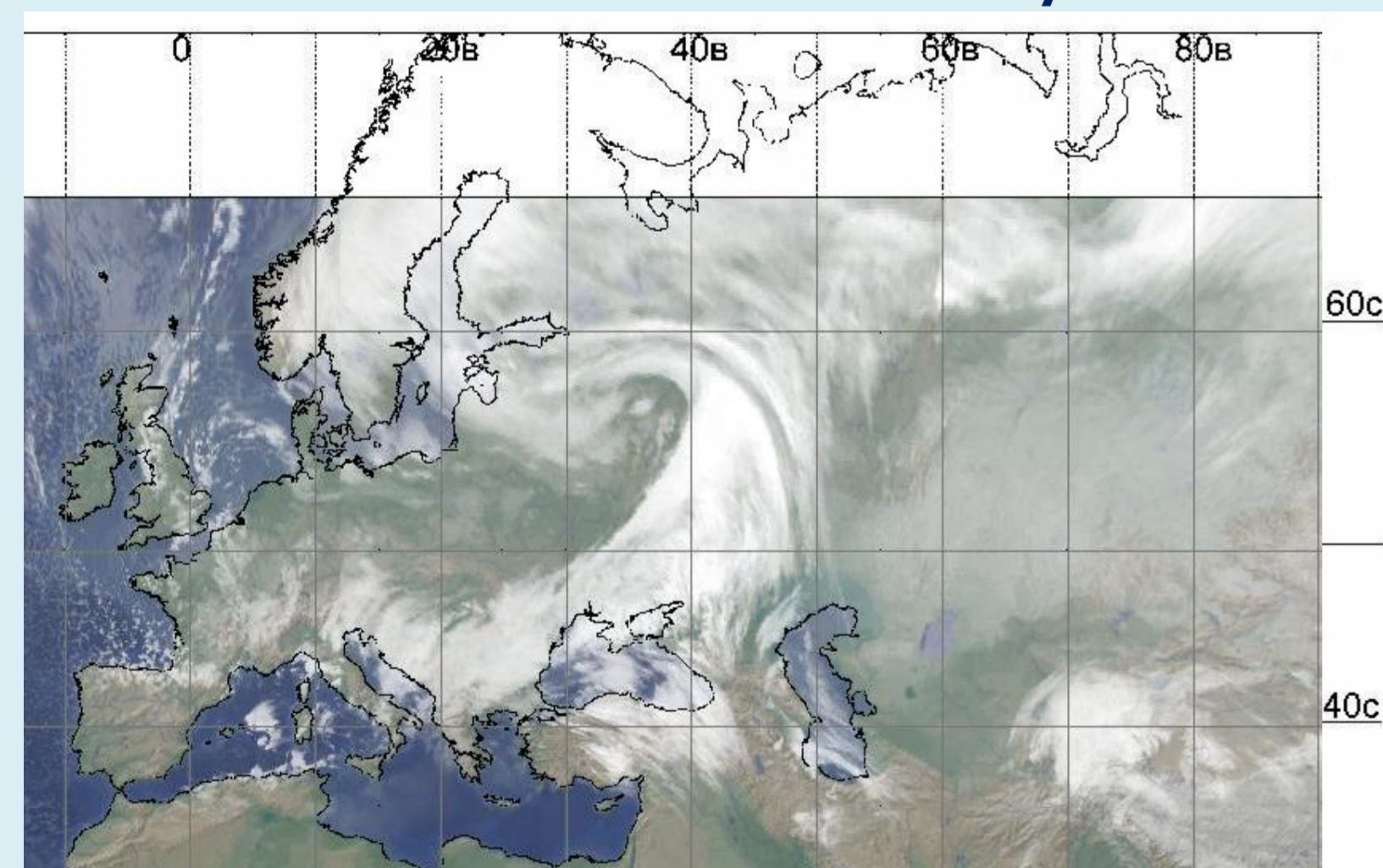
COSMO-Ru7 fields. 1 February 2015. 78h forecasts
Low cloudiness
reference   new technology   new technology – reference

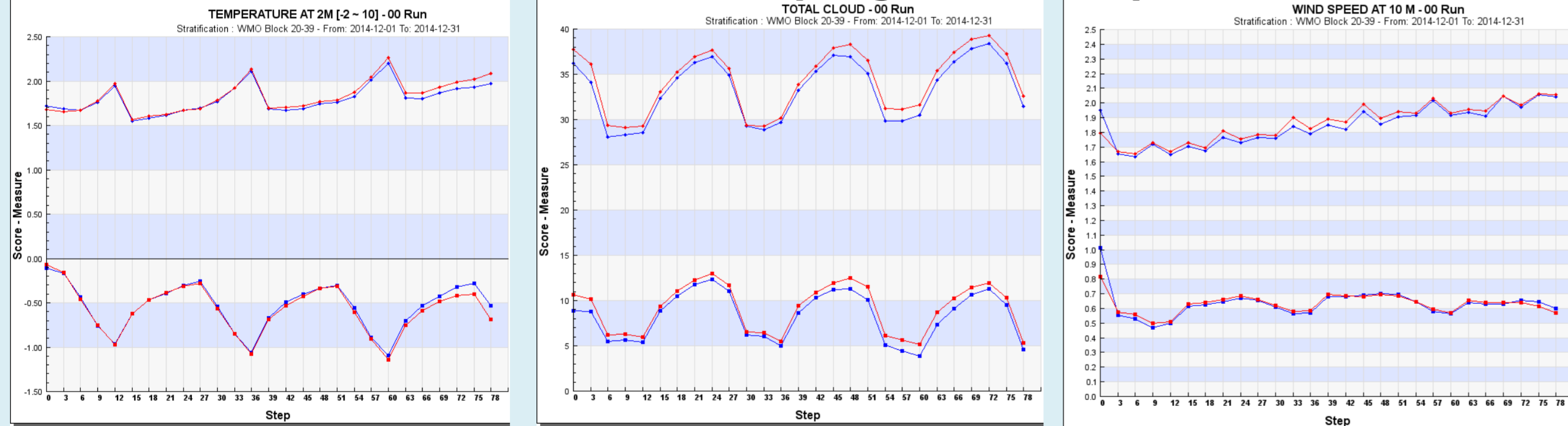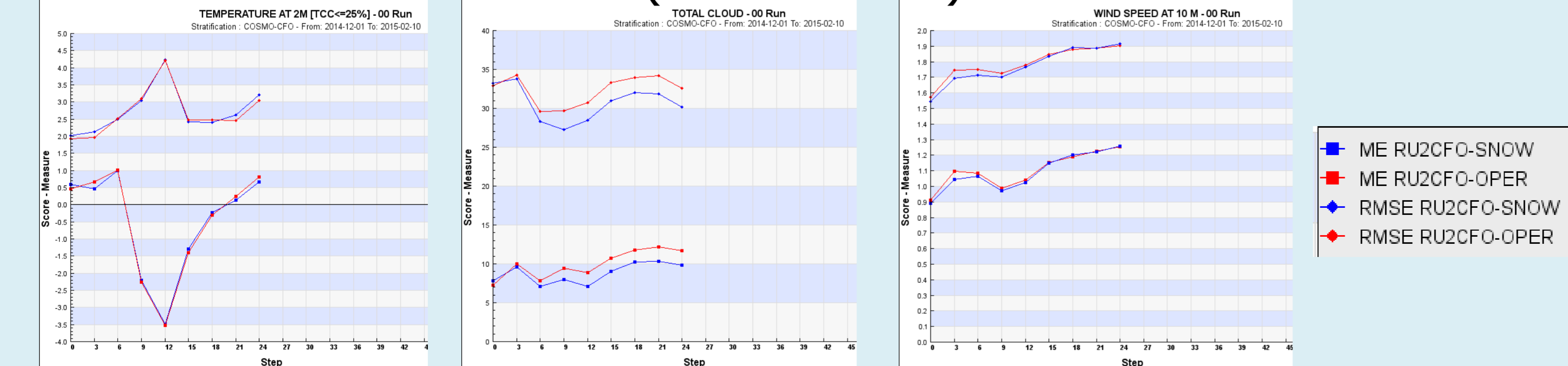Surface albedo (left) and SWE (right) (new technology – reference)