PRELIMINARY RESULTS OF CANARI SNOW ANALYSIS SCHEME TESTING

Jure Cedilnik, Lora Taseva

There is only one line to be uncommented in hop.F90 to activate the snow scheme in CANARI package.

The general tunings were taken from the work of Lora Taseva and Francoise Taillefer in autumn 2009:

- no relaxation to climate,
- all stations higher than 2000m were excluded,
- the maximum allowed difference between model point and station was 500m,
- same sigma for obs and model.

The first test was performed for January 15th, 2009. According to subjective evaluation, the results seem very good, see Figure 1.
Namely, the amount of snow is correctly added (Germany, Poland, northern Italy...) or removed (Hungary, Austria...). These results are also in agreement with Lora's results for ALADIN-FR domain.

The next test was to evaluate the behavior and performance of this scheme in an assimilation cycle. The cycle was constructed with only snow analysis and no other data assimilation. The beginning of the cycle was January 10th, 2009 and it lasted for 20 days. For comparison, another cycle was launched without snow analysis but with snow reservoir first guess initialization (cycling of snow amount).
Surprisingly, strong oscillations were observed (a flip-flopping pattern) of equivalent snow reservoir in many regions (Figure 2).
This pattern has yet to be studied and explained.

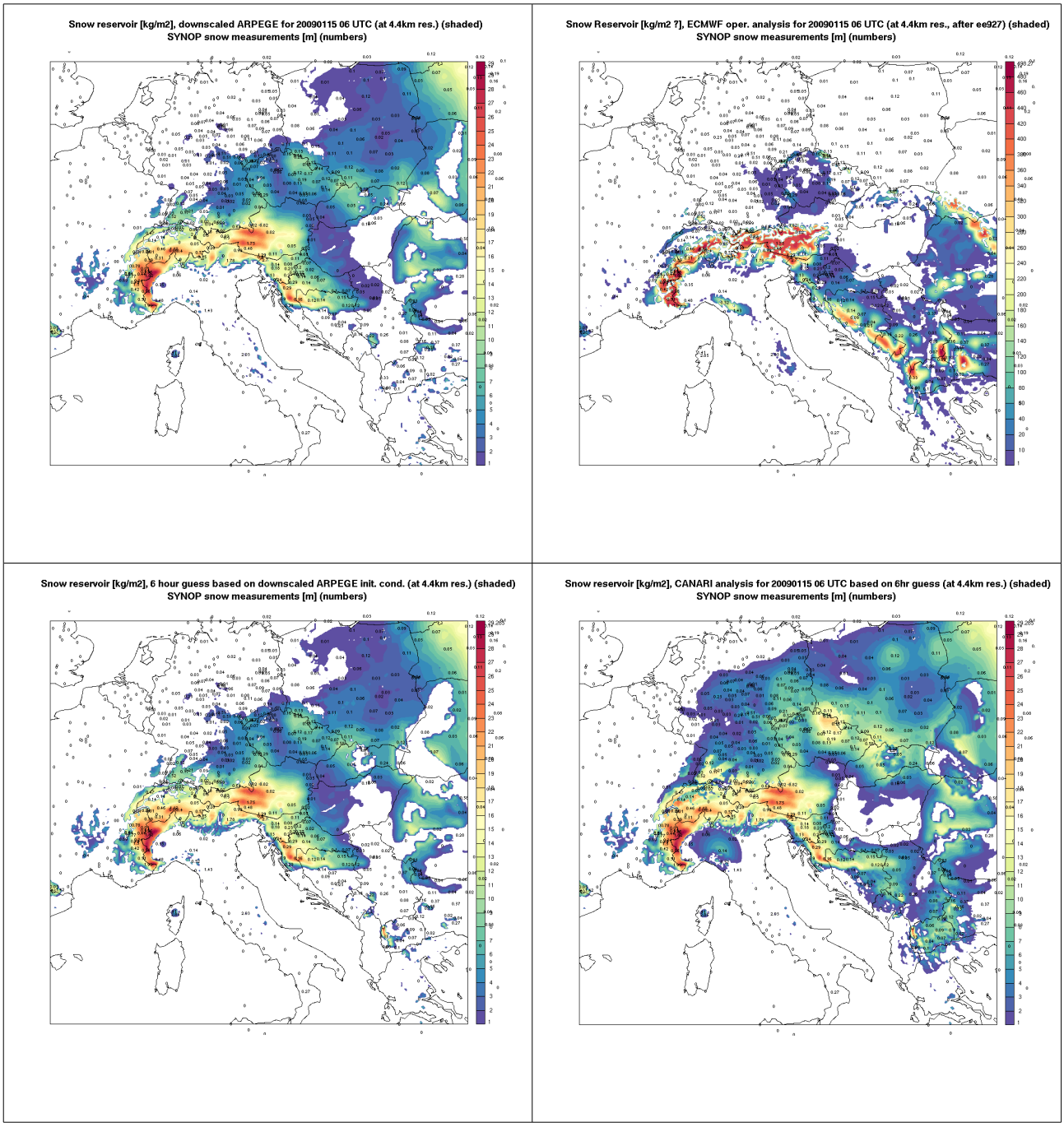

Figure 1: Equivalent snow content in: Arpege (top left), ECMWF (top right), ALADIN 6 hr first guess after initialization with Arpege (bottom left) and ALADIN after CANARI analysis (bottom right). The CANARI analysis is based on first guess in bottom right. All plots are valid for Jan 15, 2009 at 6 UTC.

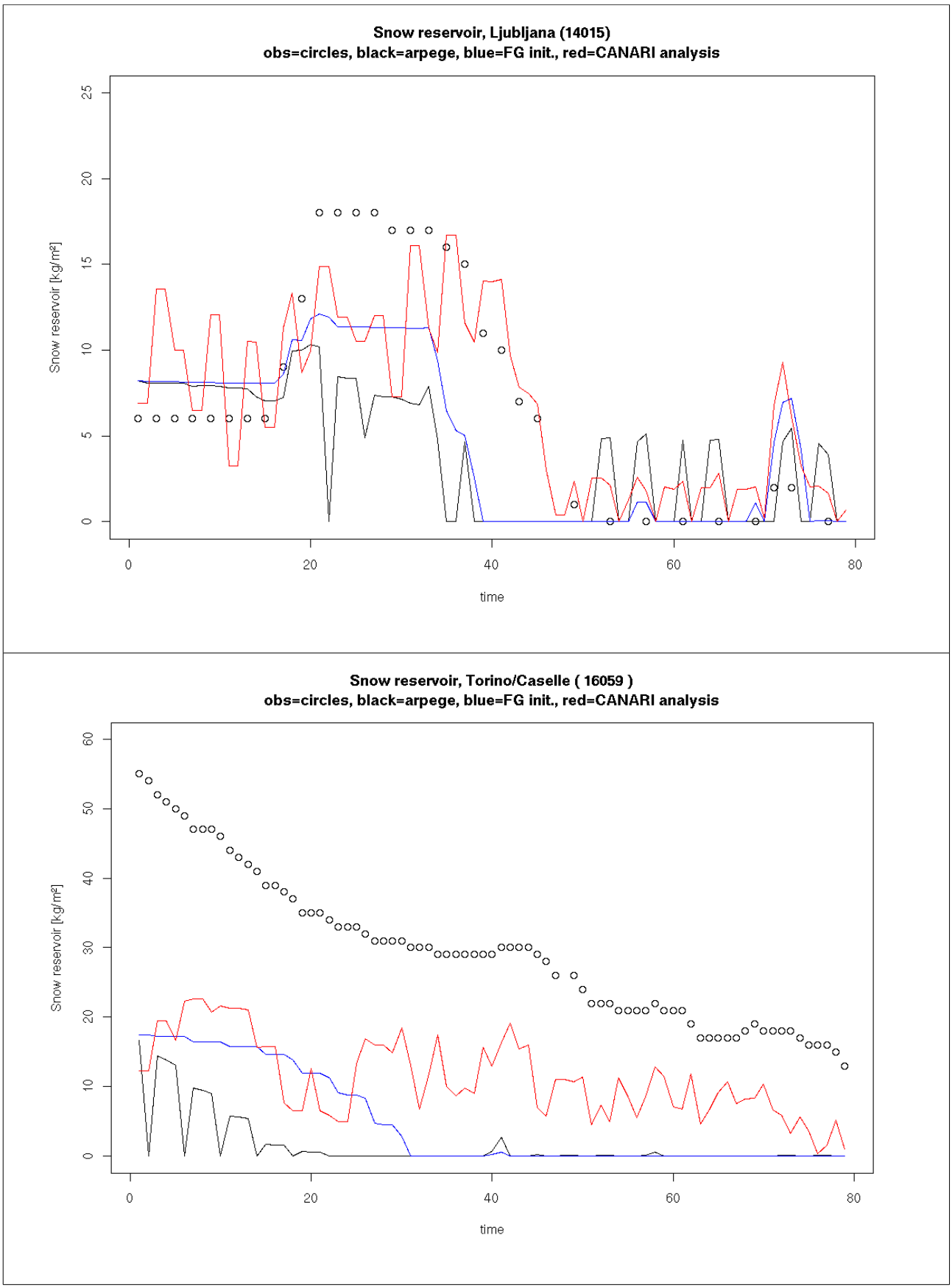

Figure 2: Time series of snow reservoir for two stations: top - Ljubljana, bottom – Torino. Observation values are with circles, downscaled Arpege is in black and analysis in red. Additionally the first guess init run (full cycling of snow) is in blue. The scale is from Jan 11th until Jan 29th, every 6 hours.