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# Moisture balance over the Iberian Peninsula computed using a high resolution regional climate model. The impact of 3DVAR data assimilation.

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A numerical downscaling exercise over the Iberian Peninsula has been run nesting the WRF model inside ERA Interim. The domain covers the Iberian Peninsula with a 15 x 15 $km^2$ grid with 51 vertical levels. Two experiments have been run during 2010-2014 after a one year spin-up (2009). In the first experiment (N), boundary conditions drive the model after the initialization. The second experiment (D) is configured as N, but 3DVAR data assimilation is run every six hours (00Z, 06Z, 12Z and 18Z) using observations from the PREPBUFR dataset (NCEP ADP Global Upper Air and Surface Weather Observations). Both experiments use the NOAH land surface model.

For both N and D runs, the moisture balance of the model runs has been evaluated over the Iberian Peninsula, both internally according to the model results (moisture balance in the model) and also in terms of the observed moisture fields from observations (precipitable water and precipitation). The verification has also been performed for ERA Interim.

Results show that the leading terms that must be considered are the tendency in the precipitable water column, the divergence of moisture flux, evaporation and precipitation. Both mesoscale model runs close better the moisture balance over the whole Iberian Peninsula than ERA Interim. The N experiment shows a better closure than D because of the lack of analysis increments in it. Both ERA Interim and the D experiment produce a negative residual in the balance equation, compatible with excess evaporation or increased convergence of moisture over the Iberian Peninsula.

The seasonal cycle of evaporation is much closer in the D experiment to the one in ERA Interim, with a higher evaporation during summer months. However, both regional climate model runs show a lower evaporation rate, particularly during summer months.