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A study of recycling processes with moisture tracers embedded in the WRF model over the Iberian Peninsula. Comparison with classic recycling models.

Sabela Regueiro Sanfiz (1), Gonzalo Miguez Macho (1), Alexandre Rios Entenza (1), Rita M. Cardoso (2), and Pedro M. Matos Soares (2)

(1) Non-Linear Physics Group. Universidade de Santiago de Compostela. Spain, (2) Instituto Dom Luiz,CGUL. Universidade de Lisboa. Portugal

Analytical recycling models based in water budget calculations are often used to obtain precipitation recycling ratios, an indicator of land atmosphere coupling. Strong assumptions, such as that moisture is well mixed in the column, are often invoked in such models, but the lack of observations as ground truth makes the validity of those premises difficult to assess.
Here we use a moisture tracking method in the WRF model (WVTM) to obtain recycling ratios in spring over the Iberian Peninsula. These are very accurate estimations within the context of the model's simulations and thus allow for a detailed assessment of the aforementioned analytical model's assumptions and results.
In this work, we employ three classic recycling methods (Shär et al.(1999), Eltahir and Brass (1994), Dominguez et al. (2006)) to carry out recycling computations and compare them with the results calculated with WVTM.
Our simulations with WVTM suggests that moisture from local evapotranspiration (ET) is not often well mixed troughout the atmospheric column as classical models assume, and that the contribution of ET at different levels varies during the day and with the synoptic situation. These variations are reflected in recycling ratios and are not well captured by analytical models,that tend to overestimate recycling values, as in the case of Eltahir and Brass method or underestimate recycling ratios such as Schar method.
Also, the newly tagging mechanism allow us to obtain a better picture of the regional water cycle.