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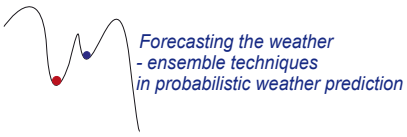

An alternative approach for regional climate model evaluation

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A novel approach is proposed for regional climate model evaluation based on the comparison of empirical relationships among model outcome variables. The approach is a quantitative adaptation of the method proposed by Betts (2004) for global climate model evaluation. The ERA-Interim reanalysis daily data is firstly used to establish relationships among different magnitudes involved in both water and energy land surface budgets. Three selected relations obtained for an area covering the upper and middle parts of two river basins within the Iberian Peninsula corresponding to the months of July (representative of the dry season) and November (representative of the wet season) are computed from the period 1989-2008. The corresponding relations are also computed for each of the regional simulations of the ENSEMBLES project using daily data over the same area. The usage of a metric based on the Hellinger coefficient allows a quantitative estimation of how well models are performing in simulating the relations among surface magnitudes. Finally, a ranking of the thirteen regional climate models participating in the ENSEMBLES project is obtained based on their ability to simulate surface processes.