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Adv. Geosci., 25, 103-110, 2010  
www.adv-geosci.net/25/103/2010/  
doi: 10.5194/adgeo-25-103-2010

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## Modelling of orographic precipitation over Iberia: a springtime case study

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**Abstract.** Orographic precipitation is a result of very complex processes and its study using numerical models is of utmost importance since it can open an important avenue to the improvement of precipitation forecasts, especially during the warm season. Mainland Portugal is characterised by a very variable terrain between the north and south regions, the latter being much smoother, with sparse mountains that barely reach 1000 m. Conversely, several mountain ranges are distributed over Spain with heights often exceeding 1500 m altitude. A mesoscale non-hydrostatic atmospheric model (MesoNH) is used to study the orographic precipitation during a limited period in spring of 2002 over the Iberian Peninsula. In order to assess the effects of the mountains, case study simulations are done, with and without the orography. MesoNH is initialized and forced by the ECMWF analyses. The effects of orography on precipitation over neighbouring regions are also analyzed. Simulations show that orography is a key factor in determining the spatial distribution of precipitation over the Iberian Peninsula, with enhancements in the regions with mountain ranges and diminution or suppression over certain valleys. The simulated precipitation fields were visually compared with radar observations in central Portugal and quantitatively compared with rain gauge data all over Portugal in order to assess the model performance in the analyzed cases.

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Citation: Costa, M. J., Salgado, R., Santos, D., Levizzani, V., Bortoli, D., Silva, A. M., and Pinto, P.: Modelling of orographic precipitation over Iberia: a springtime case study, Adv. Geosci., 25, 103-110, doi:10.5194/adgeo-25-103-2010, 2010. [Bibtex](#) [EndNote](#) [Reference Manager](#) [XML](#)



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