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Interactive comment on "Sub-continental transport mechanisms and pathways during two ozone episodes in northern Spain" *by* G. Gangoiti et al.

Anonymous Referee #2

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General comments:

Pollutant transport and transformation phenomena tend to be quite complicated in case of rough and inhomogeneous terrain. Dispersion is governed by manifold mesoscale meteorological phenomena and various circulation patterns may evolve, resulting in non-stationary and spatially highly irregular pollution patterns. Among other areas in Europe, such irregular pollutant concentration distributions are known to occur in the Iberian Peninsula. Millan and other researchers have demonstrated since the 80s that air quality problems in Spain and Portugal are closely associated with the complex

mesoscale processes regularly observed in the area.

State-of-the-art mesoscale meteorological models are appropriate tools for the description of complex dispersion processes as those occurring in the Iberian Peninsula. The authors of the present paper apply the mesoscale model RAMS, combined with the dispersion model HYPACT for elucidating the origin of ozone and its precursors at times of episodes in the Basque Country. Their overall analysis is of high scientific quality, and the clarity of the meteorology description is undoubtedly a strength of this paper. As such, the concept followed may not be that novel, but the results obtained are interesting, the explanations provided quite convincing and the conclusions relevant and certainly important from the application point of view.

Specific comments:

A weakness of the approach followed by the authors is related to the fact that they analyse ozone episodes without discussing the important chemistry issues of their problem. They follow passive tracers and neglect transformation processes, this severely limiting their ability to predict ozone levels in a quantitative sense. Of course, even the best chemical mechanism would have been of marginal value under so complex meteorological conditions, if the treatment of meteorology would not have been adequate. Yet, the reader would have welcomed remarks on, e.g., the timing of ozone build-up and the chemical characteristics of the interaction between air masses differing in their pollution burden.

As another rather specific comment related to this paper, it is not clear why the authors limit their discussion in conjunction with Fig. 2 to measurements in the Bilbao area. Air quality measurements are certainly also available for sites close to the boundaries of domain 3, and here one could have expected a different behaviour than in Bilbao and its surroundings. Moreover, as regards the comparisons between observations and model results (Figs 4 and 5), the agreement is overall very satisfactory, but why did the authors decide not to use any standard statistical means for their assessment?

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Technical correction:

Overall, the paper is very well written, both from the structure and the language point of view. There seem to be almost no printing errors (exception: “tritation” instead of, correct, “titration” in line 25 of page 10662). So, this reviewer would encourage the authors to address the above comments in the course of a minor revision, in order that the improved paper be accepted for publication.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 10657, 2005.