

## ***Interactive comment on “Origin and transport of Mediterranean moisture and air” by I. Schicker et al.***

**Anonymous Referee #2**

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This is a paper which is no reasonably focused and scientifically it not sound well. It is one paper in a series of relatively similar papers recently published (e.g., Nieto et al. (2006), Sodemann (2008), Nieto et al. (2007), Stohl et al. 2008, Nieto et al. (2008), Drumond et al. (2008)). The method used has been described and used in earlier papers and the application to Mediterranean region seems no sufficiently original. Therefore the objective of the article must be clearer and the results should contribute new tools or analysis. As the author commented there are three European projects involved on Mediterranean topic (CIRCE, MedClivar and HyMex). A review of the abstracts presented on HyMex and the results of MedClivar grants show that within both projects similar studies about Mediterranean moisture were presented by other authors during 2008. This paper does not improve those previous results. So, I cannot recommend the publication in a journal of high standard such as ACP. This

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paper seems more a report of a project or an extension of an abstract of a poster, like an extended proceeding. It has a great descriptive part and a very small or none of interpretation.

Besides this, the authors must complete the explanations in several topics. I have some major concerns that the authors should address.

Major comments:

1.- The biggest problem I have with this paper is that it should be much more precise about what is the reason for divide the Mediterranean Sea in 8 parts (namely by the authors as Regions Of Interest (ROI), figure 1). Always this type of regionalization needs a good foundation based on meteorological parameters and this explanation does not appear in the method (if it exists). Without this research prop the rest of the paper may not have enough scientific value.

2.- Another problem the paper has is the several time periods of integration. Why the authors consider 30- and 90-day span? If you go back long enough in time you will eventually find a trajectory from the South Pole! I know that it is impossible, but it is known that the average residence time of water vapor in the atmosphere is limited to 10 days (Numaguti, 1999). Furthermore, Trenberth (1998) estimates that the e-folding residence time of atmospheric moisture is just over 8 days, the globally-averaged fields are 8.1 days for precipitation and 8.5 days for evaporation (Table I in the cited paper). If you make calculations without sense you could find absurd results and then they are impossible to justify. Are the author sure that so far areas around the Himalaya or Tibetan Plateau influence the Mediterranean moisture? The selection of 30 or 90 days as a possible interval seems a bit far fetched. So, expansions on time to make backward or forward trajectories is an unnecessary work and it has no sense include these tests of calculations in any paper.

3.- The precipitation budget is inferred from E-P calculations. Previous literature points to this kind of approximation has a lot of errors, due the several modelled data.

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4.- The method is easy to understand if you read very carefully the papers by Stohl and James (2004, 2005) and by Nieto et al. (2006, 2007). However, in this paper the method is not clearly explained and whichever paper needs to be auto-comprehensive. The quantification of moisture is really unclear and not well-explained.

5.- Does evaporation of precipitation in the atmosphere contribute to E? I would assume so. How do you interpret trajectories that take up water vapor, rain out, take up water vapour again and then rain out over your target region?

6.- In the general sense, the period of evaluation is too short to make any conclusions on the representativeness of the results for climate. They point to during the selected period 2000-2004 two extreme events are contained, the heavy Central European flooding event in 2002 and a drought event in 2003. How do the authors compare the results with climate records?

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 21425, 2009.

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