

Interactive comment on “Comparison of Eulerian and Lagrangian moisture source diagnostics – the flood event in eastern Europe in May 2010” by A. Winschall et al.

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Received and published: 18 March 2014

This paper studies Eulerian tagging diagnostics and Lagrangian diagnostics for a heavy precipitation event. The comparison of diagnostics is useful and may allow the moisture sources of this and other events to be quantified more accurately. For these reasons, I find the paper to be well written and interesting, and ultimately worthy of publication. I do have some issues that should be addressed prior to publication.

Major comment 1: On Page 29334 Line 17- ‘The most important source is local evapotranspiration from the European land surface, followed by moisture from the North At-

C12935

lantic. Further relevant contributions come from tropical Western Africa (10–20°N). Contrary to expectations, the Mediterranean Sea contributes only about 10% to the precipitation event.’ – Here and in other parts of the paper, you downplay the role of the Mediterranean contribution. Even though only 10% of the moisture came from the Mediterranean, a heavy precipitation event is more complicated than total moisture and the sources of the moisture, e.g. why was the system stationary for three days? While interesting, the moisture source composition cannot describe the contributions from a particular source as important or unimportant. This statement and others later in the paper go a bit too far in describing the importance and unimportance of different sources.

Major comment 2: The differences in height of the sources for both the Lagrangian and Eulerian approaches is an important aspect that I feel has not received enough attention. I recommend providing more details about these differences. For example, at what vertical levels do the different sources originate? A figure describing these differences for a few vertical levels would be helpful.

Page 29341 line 21- The word weight implies that you can assign a value to the importance based on the time of moisture uptake before the event. I would suggest that the wording is changed.

Page 29346 last paragraph– More details are needed on the trajectory integration scheme. How is the target region defined? Why is the vertical distribution chosen this way? What fraction of trajectories satisfies the given criteria, and what is their initial distribution within the target region? What vertical levels do they come from?

Page 29347 Section 5- Similar to the previous comment, more details on the trajectory integrations are needed. By 25km x 25 km grid, I assume that 25 km is the horizontal distance between trajectories, not the size of the entire grid. Grid spacing would reduce the ambiguity. Also, it is not clear how the trajectories are distributed in the target region. Do they fill the entire target region? A reference to Figure 3 would be useful at

C12936

this point. How sensitive are the results to the choice of target region?

Page 29351 Section 7- After looking at Figures 12 and 13, one can deduce that the two trajectories originate at different heights. This should be stated in the text as well. Do they also originate at the same time and horizontal locations? Are these differences in initial location, especially in height, a more general tendency for all trajectories in this study?

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 29333, 2013.

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