Review of: "Classification of cyclone tracks over Apennies and the Adriatic Sea"

By: Horvath et al. (2007)

Recommendation: Return for major revisions

General Comments:
This paper subjectively uses ECMWF analyses to determine the cyclone activity around the Adriatic Sea over a 4-year period. Four different cyclone types are identified to add to the numerous other studies that have attempted to determine the cyclone tracks in this region. Although some new knowledge has been obtained about the diversity of these tracks, this paper suffers from lack of scientific motivation as written, has some flaws in subjective cyclone identification, and adds little new insight into the physical mechanisms. These three major problems can be summarized as follows:

1. After reading the introduction, it is not clear what the scientific motivation is for this study. Obviously, there has been a lot of previous cyclone tracking studies in this area. Why new scientific insight is being added with this new tracking study? To be honest, I got lost half way through the paper as I tried to painfully remember all these tracks. It is easier to remember when the motivation is clearer.

2. The approach used to identify cyclones seems too subjective. Obviously, to write an automated algorithm to identify mesoscale low centers is very difficult, so doing the tracking manually is not a problem, but the authors still need some strict definitions of how the cyclones were identified. It is mentioned that a 2-mb closed contour was used, which is good, but then things get hairy, such as "streamlines were analyzed to identify the associated circulation pattern in the pressure low area. If the pressure low was strictly above the sea, usually closed circulation cyclone identification was required. However, if the cyclone was shallow or in the vicinity of the mountains, a strong surface convergence or expressed streamline curvature pattern was recognized." There is no way someone can duplicate this study with this sort of vague subjective criteria. The authors need to generate some objective convergence and vorticity thresholds, so one can try perhaps try the approach with another five years of data. Otherwise, we will have another paper in another fives years with a completely new approach and new set of tracks.

3. There seems to be little new physical insight for the various cyclone tracks. Section 4 tries to relate a few cases to some terrain forcings noted in previous studies, but this hand-picked case approach is not very appealing statistically. It would be much more effective if the authors could composite the synoptic fields associated with cyclones in particular regions to relate the terrain forcings, etc… If the key synoptic features that the authors mention for select cases really important, they should show up in a composite of many cases of the same cyclone track type.

Some other comments:

1. pg. 4, 7 lines from bottom: Not sure what is meant by "reliability of the current state-of-art objective algorithms diminishes as the resolution of complex terrain increases…" What algorithms are you referring to?

2. pg. 6: This sentence is not clear, "Furthermore, a focus on smaller region gives more information on less frequent events that provides a complete picture on the cyclone activity in the area." If focusing on small region results in less events, how does this provide a complete picture?

3. pg. 7, top: Is there a reference to this Croatia approach? Is your approach a new one, with no previous studies to reference as a starting point?

4. pg. 9 and Figure 2: It appears that the discontinuous A-II has fewer tracks than the continuous A-I, but it is not clear from this figure that there is a real distinction between the two. Are these tracks really different statistically? This comments holds for all the other tracks as well.

5. pg. 10, line 13: The Froude number is mentioned here, but was it actually calculated or related to this study? Seems pointless to mention it, if it is not really used here.

6. pg. 10, 2nd to last para: What distribution are you referring to in this paragraph. No figures or tables are referenced in this discussion.

7. pg. 13, middle: Where is the evidence to suggest that the Adriatic cyclones are usually weaker. There are many statements in the last few pages, which do not seem to be supported by any figures.