

## ***Interactive comment on “Seeking for key meteorological parameters to better understand Hector” by S. Gentile and R. Ferretti***

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The paper presents the analysis of twelve Hector events realized by modelling at 1 km as finer resolution. The aim is to identify some key parameters able to drive the comprehension of the convective process. The paper has a kinematic approach and the authors remember to the readers that the study zone is one of the "region of global latent release". Can the authors say if in the pre-conditions of the 12 events analyzed they evaluated the possible effects of El Niño presence?

Many works demonstrate that El Niño effects Australia's weather and confirm its strong influence on year-to-year Australian climate variability (see references). Potential effects of El Niño on Australia include:

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-Reduced rainfall: the shift in rainfall away from the western Pacific, associated with El Niño, means that Australian rainfall is usually reduced through winter–spring, particularly across the eastern and northern parts of the continent (Bureau of Meteorology Report).

-Warmer temperatures: El Niño years tend to see warmer-than-average temperatures across most of southern Australia, particularly during the second half of the year. In general, decreased cloud cover results in warmer-than-average daytime temperatures, particularly in the spring and summer months (Bureau of Meteorology Report).

-Later monsoon onset: the date of the monsoon onset in tropical Australia is generally 2–6 weeks later during El Niño years than in La Niña years. This means that rainfall in the northern tropics is typically well-below-average during the early part of the wet season for El Niño years, but close to average during the latter part of the wet season (Bureau of Meteorology Report).

The Hector events could be influenced by the presence of El Niño especially for the effect of the "later monsoon onset". The Darwin area, indeed, is situated in the tropical region of Australia and so experiences wet and dry seasons related to the monsoon circulation. The wet season, produced by the Australian summer monsoon, usually extends from November to April. The summer monsoon has a low level equatorial origin westerly flow, and this season is interrupted by transition and break periods characterized by a low level easterly flow of continental origin. The transition period (November–December) occurs at the beginning of each wet season and terminates with the onset of westerly monsoon flow. Instead the break period, which presents analogous characteristics to the transition one, appears when there is a stop in the monsoon flow. During the monsoon period relatively weak convection (no Hector events are observed) embedded in the monsoonal flow occurs (0–1.5 km)(Keenan and Carbone, 1992). Very different types of convective systems are observed during the break and transition period flow, that can vary from continental convection to sea-breeze storm (Hector events) depending on the environment and forcing that leads to the development of the tem-

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pest. In summary, Hector is observed only during the break and transition periods.

Unfortunately the twelve events analyzed in this study cannot be used to assess the link between Hector and El Niño because the values of the Oceanic Niño Index (ONI) are negative or inside the thresholds. In details, the five events occurred during November and December 1995 have ONI equal to -1.0, 30 November 2005 and 6 February 2006 equal to -0.4, the two events of November 2007 equal to -1.2 and 17 November 2008 equal to -0.5. Probably a greater number of events developed during El Niño is necessary to understand if a positive correlation between Hector and El Niño exists.

References:

What is El Niño and what might it mean for Australia? Commonwealth of Australia 2015, Bureau of Meteorology.

Alexander B, Hayman P. 2008. Can we use forecasts of El Niño and La Niña for frost management in the Eastern and Southern grains belt? Proceedings of the 14th Australian Agronomy Conference, 21–25 September 2008, Adelaide, South Australia.

Abstract: Line 19:cancel double article "the".

It is right. The sentence will correct.

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