

Interactive comment on “Explosive development of winter storm Xynthia over the Southeastern North Atlantic Ocean” by M. L. R. Liberato et al.

Anonymous Referee #1

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Explosive development of winter storm Xynthia over the Southeastern North Atlantic Ocean M. L. R. Liberato, J. G. Pinto, R. M. Trigo, P. Ludwig, P. Ordóñez, D. Yuen, and I. F. Trigo

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General Ideas

Scientific Significance: Good Scientific Quality: Fair Presentation Quality: Good

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This paper reinforces previous studies on cyclogenesis and, in particular, the contribution of the subtropical zones in some explosive developments. The case of Xynthia was especially painful and harmful to some countries of Western European. The work is well structured and organized, providing relevant ideas in the development of extratropical cyclone and ciclógenesis with an important subtropical component. Due to these characteristics, it is worth being published in the journal.

General comments and suggestions

Xynthia. The name of storm must be explained. This is a non official name taking into account at the European NWS (National Weather Service) but very popular in the media. Xynthia suffered an explosive cyclogenesis process at low latitudes. It may be useful to devote specifically some lines to this topic in the paper. SST abbreviation may be explained when it appears in the first time.

1 Introduction

Comments

High values of EPT (equivalent potential temperature) at low levels tend to reduce the static stability across the troposphere and, so to reinforce the interaction between low level cyclone and high level systems, both of them leading cyclogenesis: the cyclogenesis processes and interactions are more effective than normal conditions when static stability is low.

2 Data and Methodology

Comments

Mimic_ TPW products may be considered for those days (*, see section 3.4). Subtropical irruption of humidity tongue or atmospheric river: ftp://ftp.ssec.wisc.edu/pub/mimic_tpw/animations/natl/2010/20100226T000000anim72.gif
ftp://ftp.ssec.wisc.edu/pub/mimic_tpw/animations/natl/2010/

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448 20. The sentence of the text is not clear: "This is a typical feature for Northern Hemisphere cyclones..." All types of cyclone? Subtropical/hybrid cyclones? Extratropical cyclones and cyclógenesis?

3 Results

3.3 General suggestion: Eumetrain/eport/archive web page allows and provides the combination of IR/WV/VIS imagery and ECMWF fields, so it is possible to improve the figure 5.

http://eumetrain.org/eport/archive_euro.html?width=1280&height=1024

453 5. Comments The concept of WCB, warm conveyor belt is not clear when it is explained in the text. The cloud band observing IR imagery is just only one significant part of the WCB. There are zones, forming de WCB, but they are not detected by IR channels. WCB is formed by cloud, moisture zones, etc.

The descending dry air from aloft must be explain using WV channels rather than IR imagery.

3.4 Moisture and TPW (Total Precipitation Water). See * en 2

May this technique (based on E-P field) be used with subtropical/hybrid cyclones?

455 20 Is there any evidence or consideration about SST anomaly origin??

456 5 Comments

Enhanced EPT at 850 hPa may increase de baroclinic processes or temperature/moisture gradients between polar-subtropical air masses, which in turn it may reinforce the cyclogenesis processes. The cold front and frontogenesis are well developed as shown IR imagery. In other words, low latitudes baroclinic processes need intense tongue of moisture and temperature to supply additional energy in explosive cases.

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4 Discussion and concluding remarks

Pag. 457 14 "... the total number of cyclones may decrease in this region ..." But, what type of cyclones: subtropical, extratropical, hybrid???

Figures and captions

Figure 1: Source of images? Places and locations are not familiar for "basic" readers "a) b).. c)" are not standard tags in this article. See figure 5 for a, b.. into a square.

Figure 3: Where is Santander and the buoy location?

Figure 4: "a" and "b" do not appear in the figure and the captions.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/1/C182/2013/nhessd-1-C182-2013-supplement.pdf>

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