



Katabatic wind and Terra Nova Bay polynya: a study using two different versions of the Eta model

G. Casini, S. Morelli

Dept. of Physics, University of Modena and Reggio E., Modena, Italy

(morelli.sandra@unimore.it)

Eta model is an international model, used for research or development in a lot of countries. Moreover, it is one of the mesoscale numerical weather prediction model operational at National Center for Environmental Prediction (NCEP) and at Center for Weather Prediction and Climate Studies (CPTEC).

In the late nineties came out a problem about strong downslope winds, that tend to be underestimated in Eta model simulations; in recent publications of Mesinger and Jovic [1], and Mesinger, Jovic et al. [2] is suggested that the problem could be due to step-mountain eta discretization, and is proposed a simple scheme to address it (eta 'sloping steps').

An updated version of Eta model that contains in particular this modification (available at CPTEC web site www.cptec.inpe.br/etaweb) was used in this work.

Strong interactions take place between katabatic winds and coastal polynyas, like Terra Nova Bay (TNB) polynya [3]. Because of the almost impossible access to TNB in winter, model simulations are an important tool for the study of polynya's events, besides the Eta model has been used with good results for studying Antarctic conditions [4].

This study is focused on a TNB polynya case happened in period September 15-16-17/2003; the presence of coastal polynya of about 3100 Km² in that days over TNB is displayed in ASAR satellite images [3]. 72-h simulations of the meteorological conditions in that period were carried on with Eta model in old (NCEP) and new (CPTEC) version, both coupled with a land surface model derived from the Oregon State University (OSU). The simulations were performed with 50 layers from sea

surface to 25 hPa, with higher resolution near the bottom of the domain. Horizontal resolution was 0.05×0.05 transformed degrees (about $8\text{Km} \times 8\text{Km}$).

Using the NCEP and CPTEC versions of the Eta model, descriptions of the event, in particular the representation of the katabatic wind, are presented and discussed.

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