MESOSCALE SHORT-RANGE ENSEMBLE PREDICTION OF HAZARDOUS WEATHER EVENTS OVER THE WESTERN MEDITERRANEAN

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I. INTRODUCTION

The Western Mediterranean is a well known area where active cyclones regularly develop leeward of the major mountain ranges that surround the Mediterranean basin, such as the Atlas, the Pyrenees and the Alps (Font, 1983; Buzzi et al., 1998; Ramis et al., 1998; Romero et al., 1998a). When leeward cyclogenesis is reinforced by other mechanisms such as baroclinic growth or adiabatic contributions, the resulting cyclone has potential to become intense and produce hazardous weather on the highly populated Mediterranean seashores (Homar et al., 2002). Predicting severe weather, such as strong winds and heavy rains, which may result from these intense cyclones, becomes a great challenge due to the multiple mechanisms involved in their genesis and evolution.

II. PRESENTATION OF RESEARCH

Numerical ensemble prediction systems (EPS) are used in the major forecasting offices for medium-range forecasts to cope with the ever-present sources of error in the forecast system and to produce a statistical estimate of the possible future states (Kalnay, 2003). The generation and interpretation of EPS for the mesoscale pose new problems with respect to the global scale prediction owed principally to the largely unknown analysis errors and the larger model uncertainties (Stensrud and Fritsch, 1994a and 1994b; Mylne et al., 2002; Stensrud and Wicker, 2004).

III. RESULTS AND CONCLUSIONS

This study proposes the analysis of intense lee cyclogenesis events by means of various tests of EPS configurations (mainly, multi-physics and perturbing initial and boundary conditions) applied to the Western Mediterranean to investigate the predictability of the factors that favour the development of these phenomena. To concentrate on sensible weather, EPS verification focus mainly on near-surface weather variables, especially precipitation, 2-m temperature, 10-m wind and sea level pressure for the considered episodes.

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