INTRODUCTION

This work was initially started in the frame of a collaboration among APAT—Dept. for Inland and Marine Waters Protection, the CNR—Institute of Atmospheric Science and Climate and the CRATI consortium. The first aim was the QPF verification (Federico et al., Nuovo Cimento, 27 C, 2005) of two limited area models (LAMs), namely RAMS and MM5, set-up by CRATI for weather forecasting over Calabria.

In addition, the precipitation fields modelled by QBOLAM (APAT’s forecasting system) were included into the intercomparison as well. This model was previously evaluated over northern Italy – 8 months – and then considering a two-year dataset over Italy.

THE CONTIGUOUS RAIN AREA ANALYSIS

The assessment of the agreement between observed and forecast fields is obtained by employing the CRA analysis (Ebert and McBride, J. Hydrol., 239, 2000): an object-oriented technique based on a pattern-matching of two contiguous areas, observed and forecast, delimited by a chosen isohyet (in this case: 0.5 mm day⁻¹). For each day, the forecast pattern has been shifted in lat.–lon. from −5 × 0.1° to 5 × 0.1°.

AN OVERALL EVALUATION

In order to summarize the CRA results and characterize the forecast spatial error over the N-E, S-E, S-W and N-W areas, the CRA Mean Shift (CMS) index is introduced.

EXPECTED VALUE OF CMS

If we consider an overall evaluation of models, all show a CMS value around 4, which is not particularly good. With the hypothesis of independence of the spatial displacement errors, we expect a Gaussian-like distribution. With a Gaussian distribution having a mean and a standard deviation value (σ), we should have a low value of CMS (less than 2).

CRA results using the correlation maximization (top panels) and the MSE minimization (bottom panels), as pattern-matching criterias.

Despite the difference of the total shift number (shift frequencies into CMS are indeed normalized with this value!), all models show an average forecast shift of about 40 km (CMS × 0.1).

However, a slight preference for the S-E area is obtained: precipitation is forecast north-westerly. The minimum average CRA shift is found when using the correlation maximization.