CORRIGENDUM

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A mismatch between the input model orography field and other variables of the European Centre for Medium-Range Weather Forecasts (ECMWF) used in Žagar et al. (2009a) and Žagar et al. (2009b) has recently been identified. Fortunately the mismatch does not affect the major conclusions of the papers.

The problem occurred during the extraction of the ECMWF analysis fields from their meteorological archival and retrieval system (MARS) to the N64 regular Gaussian grid used for the normal-mode expansion. The surface geopotential field, which is used as the bottom boundary condition for the computation of the P variable [Eq. (5) in Žagar et al. 2009a] was extracted as a surface field (parameter levtype = sfc) while it should have been extracted as a model-level field (i.e., levtype = ml) just like the other variables. The EMOSLIB interpolation package, which is used by MARS, uses a different method to interpolate surface and model-level fields to the regular Gaussian grid. The orography problem was highlighted in Fig. 2 in Žagar et al. (2009b) where only the wind field contribution to the energy spectra was presented. After we had identified the cause of the noise we reran all diagnostics for the ECMWF analyses and hereafter we summarize the impact of the error on the results presented in the papers.

Figure 1 presents the corrected energy spectra as a function of the zonal wavenumber, which corresponds to Fig. 6b in Žagar et al. (2009a). The corrected Fig. 1b from Žagar et al. (2009b) is shown in Fig. 2. The noise-free spectrum of the balanced motion keeps the -3 slope at all scales smaller than the baroclinic injection scale (Fig. 1). The most significant change is in the slope of the inertia–gravity (IG) spectra (Fig. 2), which now follow a $^5/_3$ slope for all zonal wavenumbers larger than 7, just like the spectra of the operational analyses of the National Centers for Environmental Prediction (NCEP; see Fig. 1d in Žagar et al. 2009b).

The consequences of the error are largest in the lower troposphere for the IG motion filtered back to the physical space because the orography field, together with our adoption of the normal-mode derivation in σ coordinates, is associated with IG perturbations. This is seen by comparing Fig. 8b in Žagar et al. (2009a) with its corrected version shown here in Fig. 3. (Notice that the wind vector scaling is not exactly the same.) Other figures that appear smoother when corrected are Figs. 5c,d and Fig. 6 in Žagar et al. (2009b), but the corrections in this case occur at the bottom levels with no relevance for the features discussed.

Energy percentages in total motions (with the wavenumber $k = 0$ included) now match exactly those of NCEP (Table 1 in Žagar et al. 2009a). The energy partition of wave motions ($k \neq 0$) is as follows: the balanced motions contain 89.8% of energy while the eastward- and westward-propagating IG waves (denoted as EIG and WIG, respectively) contribute 6.3% and 3.9% of the wave energy, respectively. The two-dimensional energy distributions are not affected. The contributions of the Kelvin waves (KWs) and mixed Rossby–gravity waves (MRGs) have changed as follows (cf. Table 1 in Žagar et al. 2009b): the percentage ratio for MRG:(IG + MRG) is 18%, KW:(IG + MRG) is 22%, MRG:(WIG + MRG) is 37%, and KW:EIG is 44%. The correction has changed all energy percentages to become very similar to the results obtained for the NCEP analyses.

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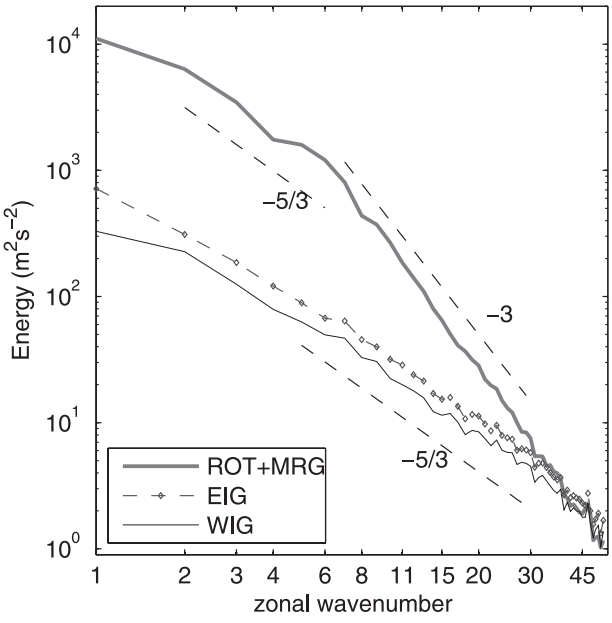

FIG. 1. Total energy in rotational (ROT), eastward (EIG), and westward (WIG) inertia–gravity motions as a function of the zonal wavenumber in the ECMWF analyses for July 2007.

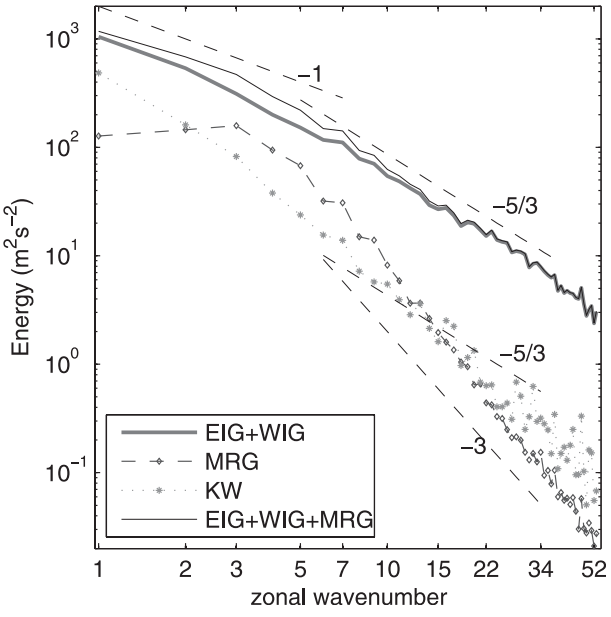

FIG. 2. The IG energy in ECMWF analyses as a function of the zonal wavenumber. Four curves display KW, MRG, and total westward- and eastward-propagating IG energy (EIG + WIG), which does not include the MRG mode and EIG + WIG + MRG energy.

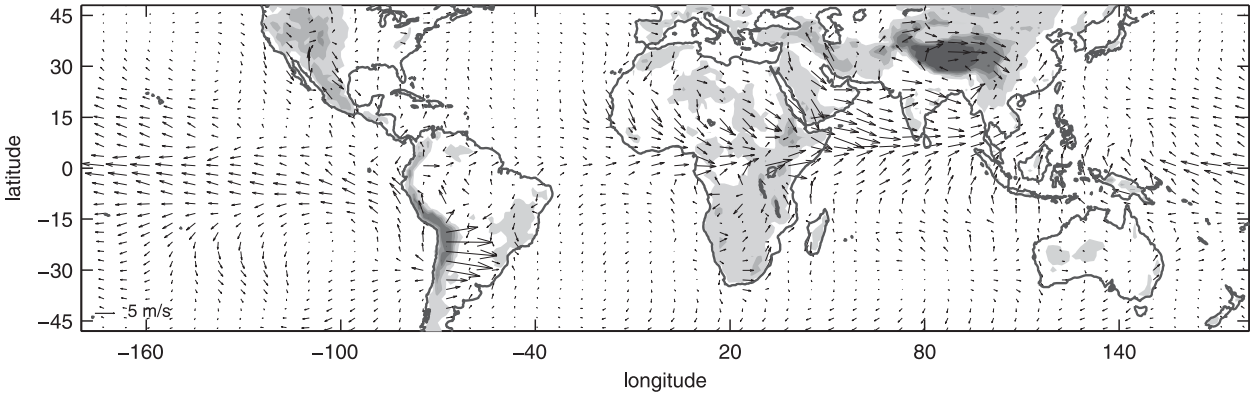

FIG. 3. Average July 2007 IG circulation at a sigma level 73 (~753 hPa) in ECMWF analyses. Shaded contours are the models' orography with shades every 1000 m, starting from 500 m to 5.5 km.

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