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Climate-mean winter and summer patterns associated with enthalpy, latent heat and linear momentum mean convergence fields due to large-scale transient eddies

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The time-average state of the atmosphere can be regarded as a forced response to the geographically fixed distribution of the mean diabatic effects, to mountain barriers and to the mean convergence fields of enthalpy, latent heat and linear momentum related to the transient eddies. These disturbances grow as instabilities in preferred geographical positions, mainly due to the non uniform properties of the earth's surface, both from the dynamical and thermodynamical points of view Peixoto (1971).

The governing equation for the mean state of the atmosphere can be derived from the potential vorticity equation Saltzmann (1962), (1963), which explicitly contain the internal effects of friction and topography, among others. The empirical forcing function can be separated into seven physically significant components, related to both mechanical (momentum fluxes) and thermal processes (heat fluxes). These components are scalar atmospheric fields that can be mapped at different pressure levels over the globe.

A descriptive analyses of the climate-mean values (averages taken for all winters (DJF) and summers (JJA) within the reference period 1961-1990) is carried out in this study and it is focused on the dynamical aspects of the large-scale atmospheric circulation over a Euro-Atlantic Sector associated with the release of latent heat due to the transient eddies (second component), with the differential divergence of the transient eddy horizontal enthalpy fluxes (third component) and with the transient eddy horizontal transports of momentum (sixth component).