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Forecasting the weather
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Seasonality and Diurnal Oscillation of Compensatory Motions within the Western Mediterranean Basin

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This communication is focused on the seasonality and the daily cycle of the prevailing compensatory subsidence in the Western Mediterranean basin. To quantify this seasonality we calculate the divergence of the horizontal wind field at 900hPa and derivate the vertical wind velocity, w $\equiv$ dz/dt, from the continuity equation and the vertical density distribution of the air in the lower troposphere. A 15-year average, of the reanalysis data provided by NCEP/NCAR, shows a diurnal generalised compensatory subsidence over the Western Mediterranean Sea with a maximum mean sinking (subsidence) motion of up to -0.4 cm/s at 18:00h UTC and 900hPa, and a nocturnal generalised upward (convergence) motion of up to 0.07 cm/s at 00:00h UTC and 900hPa. In this study, we discuss the relationship between the seasonality and the diurnal oscillation of the strength of compensatory motions (subsidence and convergence) over the Western Mediterranean Sea and the daily cycles of surface mesoscale flows (diurnal sea breezes and nocturnal land drainages) around the coasts of the basin; i.e. how tropospheric dynamics in the Western Mediterranean is the result of the interaction between the daily strengthening (day) and weakeing (night) thermally driven circulations and their compensatory motions over the Sea. Test statistics are greater than critical values for the 5% significance level of the F-distribution for diurnal mesoscale interactions among the coastal seabreezes around the whole Western Mediterranean basin and the compensatory subsidence motions over the Sea.

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