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Projected changes of the Etesian Winds from EURO-CORDEX experiments

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The Etesians are persistent northerly winds blowing over Aegean Sea during summer months (June, July and August). This study investigates the July-August (JA) pattern of the Etesians for the reference period (1981-2000) from both ECMWF ERA-Interim (ERAIN) Reanalysis dataset and eleven EURO-CORDEX RCM (Regional Climate Model) simulations and future changes using the associated RCP8.5 simulations. An EOF analysis indicates that the first two EOF modes explain 75.6% of total variances in the near surface northward wind (v10) from ERAIN. In order to identify the modes of variability, two indices are developed. The correlation coefficient between the time series of EOF1 and the first index defining the areal average of v10 is around 0.98. The second index defining v10 difference between two points correlates negatively with EOF2 (-0.95). Composite and correlation analyses show that the pressure gradient (at mean sea level, msl) as a result of high pressure over central Europe and low pressure over the Middle East is important for the strength of the Etesians (the first index). However, composite analysis indicates that high pressure prevails over the Aegean Sea for the second index. The reference period EURO-CORDEX simulations produce similar correlations and composite patterns associated with these two indices for v10, msl and 500 hPa geopotential height. Assessment of the changes in the future Etesian winds using the RCP8.5 EURO-CORDEX simulations is in progress.