

## Modulation of western boundary current influence on the troposphere by atmospheric fronts

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It is now well-known that western boundary currents anchor vertical ascent deep into the troposphere in the climatological mean, resulting in a striking imprint of the meandering ocean currents on the near-surface and upper tropospheric wind convergence fields. Traditionally, this air-sea coupling has been described mechanistically through time-mean processes. Here, by decomposing the atmosphere into frontal and non-frontal components, we illustrate that the oceanic imprint on both the near-surface and upper tropospheric time-mean wind convergence fields can be explained almost entirely by the frontal components alone (i.e. on a synoptic time-scale). Furthermore, not all atmospheric fronts contribute equally - it is in fact a small subset that do so in conditions preferential for the enhancement of the local frontal air-sea interaction. Critically, this suggests that the influence of western boundary currents on many aspects of the climatological atmosphere can be inferred from discrete, rare interactions occurring on a synoptic time-scale.

Keywords: Air-sea Interaction