**Analysis And Characterization Of Wind Circulation In A Central Mediterranean Site During Heatwave event**

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Heatwaves, often associated with quasi-stationary anticyclones, can be locally mitigated by coastal land-sea breeze circulations. To investigate this mechanism, the MESSA-DIN (MEditerranean Sea Salt And Dust Ice Nuclei) campaign was carried out by CNR-IMAA in Soverato (Southern Italy, 38°41′16′′N 16°33′00′′E) from June to November 2021. Ground-based remote sensing instrumentation, including a Doppler wind lidar, was deployed to analyze the variability of the land-sea breeze in relation to synoptic circulation, marine aerosol transport, Saharan dust intrusions and Heatwave event.

Results show a well-defined land-sea breeze regime during July–September, with daily onset around 05:00–06:00 local time, reaching up to 750 m a.g.l. at midday, and reversing at night. In October–November, the circulation weakens under the influence of low-pressure systems. Wind speed profiles reveal moderate intensities (0–10 m s⁻¹ up to 2 km) with maxima around 20 m s⁻¹ near the top of the boundary layer. A comparison with a inland site of the Mediterranean region (Potenza) is performed in order to to verify the effective mitigating action of breezes in coastal sites.

A comparison with ERA5 reanalysis confirms the seasonal evolution of the breeze system and its potential role in modulating local impacts of extreme heat under climate change. These findings emphasize the importance of characterizing coastal atmospheric dynamics to better understand and mitigate temperature extremes in the Mediterranean region.

**Keywords: remote sensing, heatwave, wind circulation**