



Sea breeze in a coastal mountain (Serra da Arrabida, Portugal)

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Two meteorological stations were installed in the Serra da Arrábida (501 m ASL), a coastal mountain in Central Portugal in order to study the temporal regime and spatial influence of the sea breeze. The mountain runs in a E-W direction with a single long interfluvium and a steep regular slope plunging into the Atlantic Ocean in the South. One station was installed by the coast at Portinho da Arrábida (19 m ASL) and the other in the interfluvium at Antenas (360 m ASL). For the analysis data on air temperature, relative humidity, wind speed, wind direction, solar radiation and precipitation at 1 hour intervals have been collected. 22 days with sea breeze were identified by applying a tree-diagram analysis (Ward's method). These have concentrated in spring and summer, mostly in anticyclonic conditions. However, sea breeze also occurred during cyclonic and "barometric swamp" events with regional wind from the north, small pressure gradients and with mostly clear skies. At Portinho the sea breeze is from SW with an average wind speed of 1.6 m.s⁻¹, while at Antenas the breeze is from SE with an average breeze speed of 1.1 m.s⁻¹. The influence of the sea breeze occurs first at Portinho and in some days it reaches the interfluvium at Antenas. This situation occurs when the breeze speed is higher than the opposite regional wind. The length of sea breeze events is also higher at Portinho than at Antenas. When the sea breeze affects the Portinho, but not the Antenas, air temperatures in the later reach higher values, even considering the 340 m altitude difference. Sea breeze shows an important cooling and moisturizing effect over the very dry southern slope of the Serra da Arrábida and is an important mitigating factor for summer fire risk.