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The interaction of northern wind flow with the complex topography of Crete Island – Part 2: Numerical study

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Abstract. During the summer months, when northerly winds are blown over the Aegean Sea the island of Crete modifies significantly the local airflow as well as the pressure and temperature fields due to its complex topography. One of the major topographical elements of Crete Island is the major gap which is located between the two highest mountain peaks, Ori and Idi. On 24–25 August 2007 strong northerly winds, with gusts up to 25 m s^{-1} , occurred at the exit of the major gap. In order to investigate the dynamics as well as the role of this elevated and sloping gap on the airflow modification, the event was simulated down to 1 km horizontal resolution using the non-hydrostatic model MM5. The model simulations show that the localized intensification of the flow downstream of the gap is related to the channeling of the flow through the gap. The strong winds are observed at the gap exit region, implying that the main cause of the strong winds is the pressure difference between the gap entrance and exit, when the relatively cooler maritime air approached the island and was dammed up the high mountains. Finally, sensitivity experiments with modified topography further supported the important role of the topography of the elevated gap, which reveals that the strong wind aspects of both gap and downslope contributions over the gap exit

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