



## **A large-amplitude gravity wave over the Adriatic**

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A study of an atmospheric pressure disturbance that occurred over the Adriatic on 27 June 2003 is presented. The pressure disturbance induced exceptional sea level oscillations and strong current reversals in the eastern part of the middle Adriatic that flooded the seafront. Barographs in the area recorded pressure amplitudes over 6 hPa. The numerical simulation of the phenomenon is performed using the MM5 model. The model results show that the cold front approaching from the north together with the orographic forcing of the Alps induced the convection over the Alps and later the appearance of a gravity wave. The wave and the developed mesoscale convective system were coupled and propagated together towards southeast. When the coupled system arrived over the warm Adriatic Sea, the gravity wave deepened and obtained its maximum amplitude over the middle Adriatic. After reaching the Adriatic, the gravity wave horizontal structure started resembling dipole or even tripole, with low-high-low pressure patterns recorded also by the barographs. The 10 min digital barograph records point to even more complex structure with one more minimum and maximum, which were not resolved by the numerical model. All the results strongly suggest that the gravity wave propagation and maintenance mechanisms are consistent with the wave-CISK model which assumes a positive feedback between the gravity-wave-associated convergence forcing the convection, and the convection providing the source of wave energy.