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The influence of orography in evolution of a Shapiro-Keyser Mediterranean cyclone

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Abstract.
The Shapiro- Keyser cyclone model (Shapiro and Keyser, 1990) was developed to describe mid-latitude cyclones that not evolve according to classical Norwegian cyclone model due to dynamical factors such as: large-scale flow in which cyclone is embedded, magnitude of surface friction, diabatic heating and orography. The influence of the latest factor in evolution of a Mediterranean cyclone that had an evolution resembling to aforementioned model is studied in this paper. During 12-13 November 2016 in Gulf of Genoa a cyclone developed and followed a trans–Balkan trajectory toward southern part of Romania. Due to initiating factors (presence of jet-streak, deep sinking of stratospheric air, low-level baroclinic zone) and the influence of the Black Sea maritime environment, the cyclone evolution (with a confluent background flow) underwent the frontal fracture stage with a T-bone structure. Stage III and IV were influenced by the presence of Carpathian Mountains when the tip of the bent-back front was positioned perpendicular to Meridional Carpathians – the highest mountains (2500 m). Consequently, the intense wind gusts exceeding 25 m s-1 were recorded both in northern and southern part of the mountains. The maps with evolution of meteorological fields of parameters associated emphasized the structure of a Shapiro-Keyser cyclone but orography affected the bent-back front development. These strong wind gusts cannot be related with that transient feature of an intense Shapiro-Keyser cyclone (Sting Jet) because a rapid deepening did not occur.
Key words: Mediterranean cyclone, Shapiro-Keyser cyclone model, wind gusts

References:
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