Geophysical Research Abstracts
Vol. 13, EGU2011-2131, 2011
EGU General Assembly 2011
© Author(s) 2011

The summer convective activity above Croatia

Maja Telišman Prtenjak (1), Karmen Babić (1), Petra Mikuš (2), and Nataša Strelec Mahović (2)

(1) Andrija Mohorovičić Geophysical Institute, Department of Geophysics, Faculty of Science, University of Zagreb, Zagreb, Croatia (telisman@irb.hr), (2) Meteorological and Hydrological Service of Croatia, Zagreb, Croatia

The aims of this study were twofold. Firstly, the analysis of the frequency of different synoptic conditions with convective activity was performed. Secondly, the sea breeze/synoptic wind interaction and its relationship with the simultaneously cumulonimbus (Cb) clouds development has been investigated in a more detail.
In the first part, a study of convection was made using lightning flashes (LINET network) during the warm part of the year (2006–2009). Spatial and temporal analyzes, based on the overall lightning flashes (cloud-to-cloud and cloud-to-ground), have shown that the western parts of Croatia, i.e. Istria and Kvarner, represent the most lightning active areas. Furthermore, starting and decaying times differ somewhat between the continental and coastal Croatian parts. The convective activity starts around noon (and soon after), and stops late in the evening. Along the coast, night-time convection is more frequent than in the continental part. The lightning flashes are frequently connected with several weather types defined by the surface pressure distribution over Croatia: $\sim$ 23% in the non-gradient field, $\sim$ 18% in the cyclone center, $\sim$ 15% in the forward and $\sim$12% in the backward parts of the cyclone, and $\sim$ 11% in the forward part of trough. These pressure formations are associated with SW (38%), NW (18%), and NE (23%) wind regimes.
Above Istria, the most convective active area, dominant weather and wind regimes (SW, NE and NW wind) already mentioned, are observed on more than 80% of all days with lightning flashes. Therefore, we investigate, via three chosen cases (for every type of the synoptic wind regime), the influence of the interaction of the synoptic wind with local thermal onshore flow on the Cb development. Results show that the SW synoptic wind is superimposed on the western sea breeze increasing the humidity advection at the foot of the mountains in Istria. Although the opposing NE synoptic wind retards inland penetration of the western sea breeze, their interaction enhances the convergence in the wind field and consequently the intensity of the sea breeze front and its updrafts. The effects of NW and SW synoptic winds are somewhat similar. In all cases, the result is favorable conditions for the Cb development in the form of multi-cells.