



Lightning activity in central Europe – preliminary climatology

Petra Mikus Jurkovic and Natasa Strelec Mahovic

Meteorological and Hydrological Service of Croatia, Zagreb, Croatia (petra.mikus@cirus.dhz.hr)

Over the central European domain an analysis of lightning activity was performed using lightning data provided by the low-frequency International Lightning Detection Network (LINET). This network detects total lightning, but it also separately detects cloud to ground (CG) strokes and intra cloud (IC) discharges. In the central part of the network even very weak lightning events can be detected ($< 5\text{kA}$) and discrimination between CG and IC lightning is more successful than in the surrounding areas, where sensors usually detect predominately stronger CG strokes. Over the studied domain lightning is detected by approximately 40 sensor sites.

Analysis of lightning activity is done on high resolution grid with spatial resolution of 0.1° (app. 1 km), which gives more detailed information about the lightning "hot spots". Spatial and temporal distributions of lightning activity, but also annual and monthly variations of lightning density over the studied region have been analyzed. During the analyzed time period maximum number of lightning strokes is detected in northeastern Italy and western Slovenia, as well as in the pre-alpine region. On the territory of Croatia, thunderstorm most active region is Istrian peninsula during the summer months and southern Dalmatia in the autumn. Above the highest tops of mountains lightning activity is rather low, but weaker lightning activity is also detected over the sea, which is partly due to lack of sensors above these areas. During the spring, the number of lightning activity increases over the land, while summer months are most active, as expected. Intensity of lightning activity over the sea and along the coastline increases in the autumn, whereas in the winter, lightning activity is pretty weak and concentrated above the coastal areas. The largest number of lightning strokes is detected in the afternoon, between 13:00 and 17:00 UTC, with the maximum between 15:00 and 16:00 UTC, where the largest contribution comes from lightning detected during the summer. In spring, the maximum is reached earlier, between 14:00 and 15:00 UTC, while in the autumn and winter lightning activity doesn't have clear diurnal cycle. Over the sea and along the coastline a significant number of lightning strokes is detected during the night time.

Presented database is still not long enough to tackle the question of changes in the lightning distribution over the years. However the plan is to follow even the smallest pattern changes in order to understand the future lightning distribution with regards to climate change.