Sprite climatology in the eastern Mediterranean region
Intended for the session: Lightning Effects on the Middle and Upper Atmosphere
(including TLEs)

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Transient Luminous Events associated with winter thunderstorms in the eastern Mediterranean have been observed from two stations in Israel. We used the standard commercial CCD cameras (Watec 902H2 Ultimate) and the UFO-capture software for event detection, commonly used by other TLE- research groups in Europe and Japan. Winter thunderstorms mostly occur in conjunction with the passage of cold fronts in Cyprus lows, and thus sprites are best observed when the storms are 200-300 km west of the Israeli coastline, above the Mediterranean Sea.

We present statistical analysis of 505 sprites observed in 7 winter campaigns from 2006/7-2012/13. Results show a clear peak in the frequency of sprite detections, with maximum values (above 40% of events) between 00:30-02:50 LST (Local Standard Time, UT+2). This distribution is very different from that of lightning in the region, which peaks ~ 05:00 LST over the sea (Altaratz et al., 2003), hinting at the different temporal behavior of +CG flashes, known to be the major producers of sprites.

The morphological analysis of 339 sprites shows clear domination of column sprites (49.3%) with angels (33.0%) and carrots (25.7%) being less frequent. This is similar to reports of winter sprites over the Sea of Japan (Matsudo et al., 2007). Other shapes (trees, wishbones, etc.; B'or, 2012) appear quite rarely. Single element events constitute 16.8% of observations, with 83.2% containing 2 elements or more. Clusters of homogenous types are slightly more frequent than mixed ones (55%). In some rare cases we observed 12-23 elements in a single sprite. The number of elements and the temporal distribution of different sprite types will be presented and compared with the properties of the parent lightning.