

Lightning distribution analysis for Natural Hazard prediction

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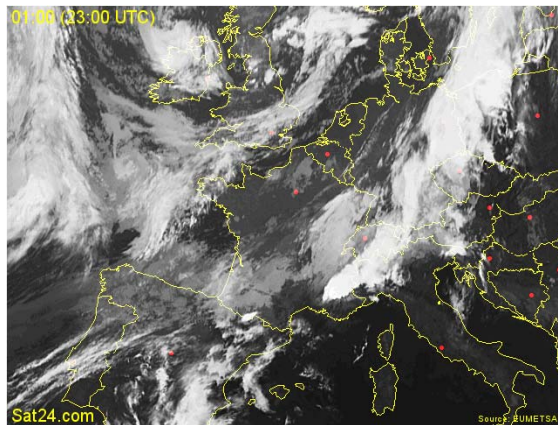


FIGURE 1. Infrared Cloud Image from Sat24.com (23:00 UTC 3 September or 01:00 CET 4 September 2008)

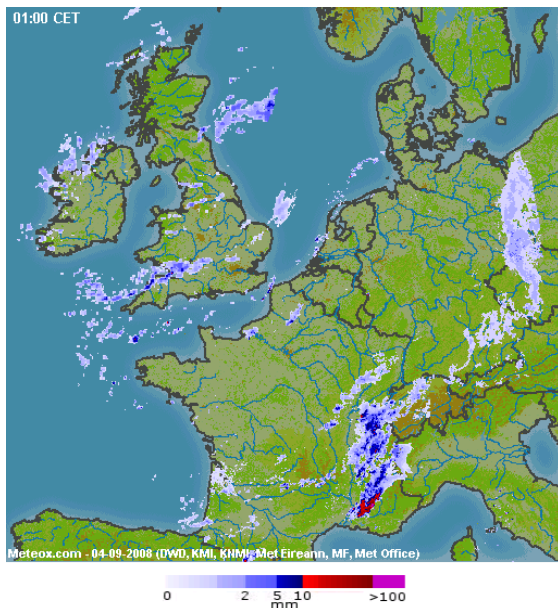


FIGURE 2. Radar Data from Meteox.com (23:00 UTC 3 September or 01:00 CET 4 September 2008)

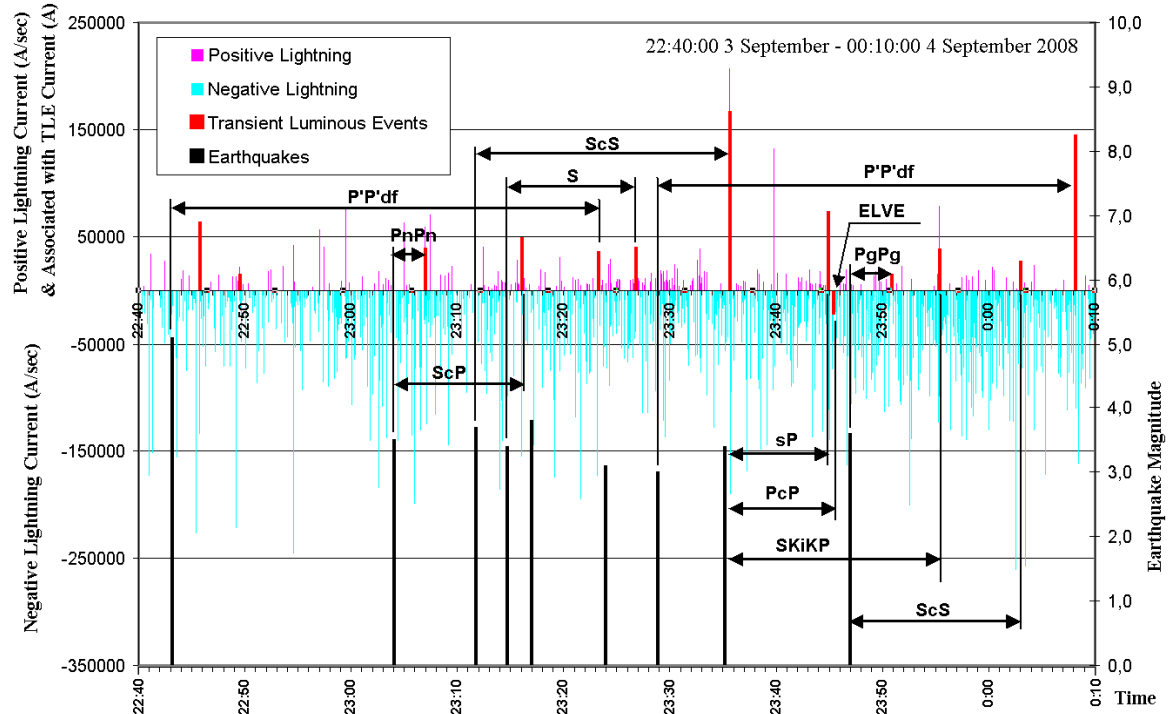


FIGURE 4. Space-time coupling between Transient Luminous Events and exact seismic waves from the earthquakes (22:40:00 3 September - 00:10:00 4 September 2008)



FIGURE 3. EuroSprite-2008 Campaign, Corsican System, multiple Sprite (21:15:49.072 UTC 3 September 2008)

The group of two Elves and 84 Sprites (fig. 5) associated with different lightnings took place in the seismological active region (Lion). The central point of TLE's group was in the coordinates: Lat(mean)=45.17, Lon(mean)=5.97. TLE's started one day after the closest earthquake (Lat=45.982, Lon=6.165, Depth=2 km, Mw=2.5 (NEIC), 30 August 2008, 2:33:06.6 U.T.). The seismic activity in this place lasted for four months after that (fig. 6) up to the end of 2008. The next earthquake in this place happened with higher Magnitude 4.2 on February 26, 2012 (Lat=44.538, Lon=6.658, Depth=2 km, Mw=4.2 (NEIC), at 22:37:55.79 U.T.).

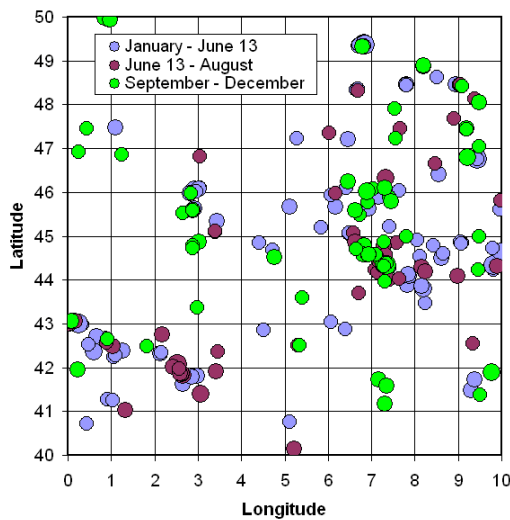


Fig. 6: Earthquake map during 2008 (NEIC USGS Catalog PDE).

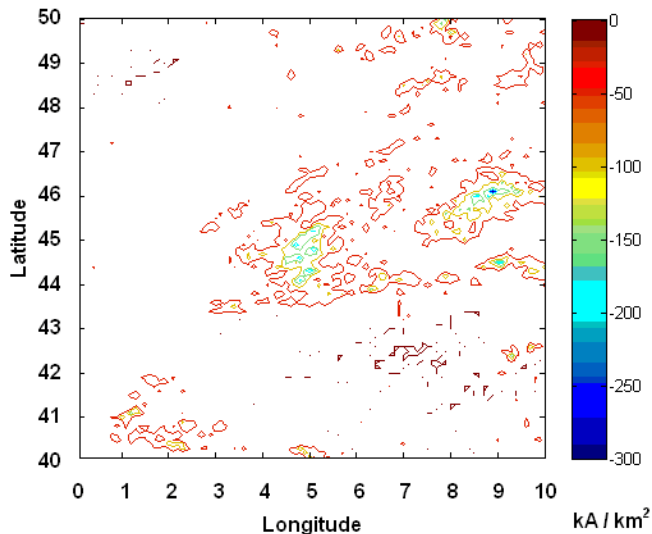


Fig. 7: The density map of negative lightning current in kA per square kilometre (Meteorage Data from 13 June till 11 October 2008).

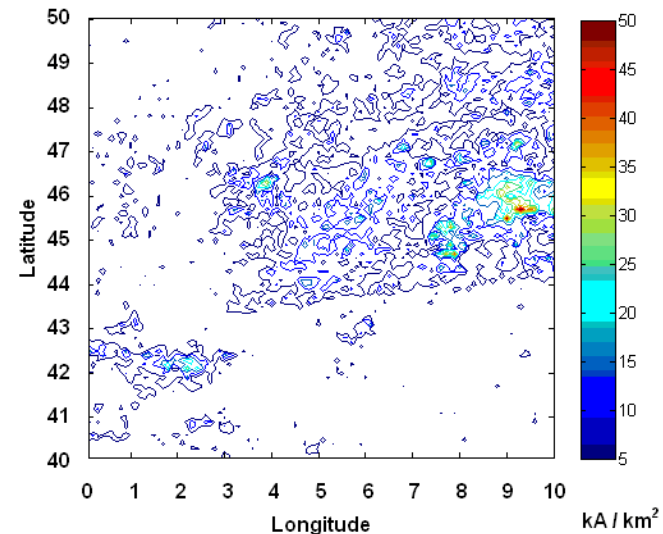


Fig. 8: The density map of positive lightning current in kA per square kilometre (Meteorage Data from 13 June till 11 October 2008).

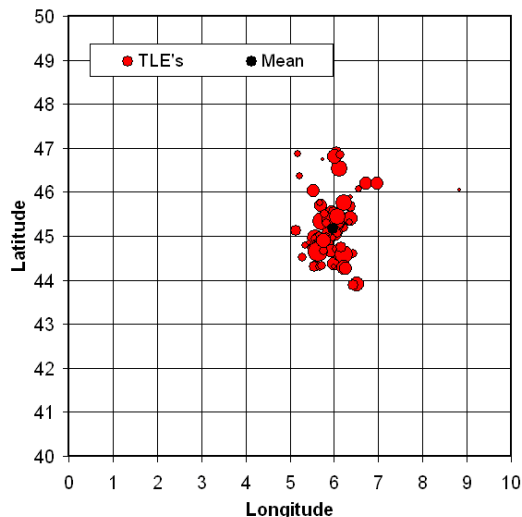


Fig. 5: Compact TLE's group of two Elves and 84 Sprites (2-5 September 2008, EuroSprite-2008 Campaign).

Conclusion

The lightning activity together with TLE's registration can be one of the new earthquake predictors. The mapping of negative and positive lightning together with TLE's can be helpful for detection of active faults and its tension. So the area of possible earthquakes can be localised in space and time.

References

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