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Time versus distance analysis of lightning activity for some lightning accidents in Austria

Authors

Dr. Gerhard Diendorfer - OVE Service GmbH, Dept. ALDIS

Mrs. Jasmina Delic - TU Vienna

Abstract

The typical number of annually persons killed by lightning in Austria is 0 to 3. On average 12 persons were injured by lightning during the last 10 years. This numbers were much higher in the past. From 1960-1969 the average number of death and injured persons in Austria was 9.8 and 21.5, respectively. Although today this numbers are relatively low, there is still discussion about further reduction of the lightning risk to humans. Lightning location data allow to analyze the temporal and spatial development of the lightning activity just prior to the time of the accident when the location and the time of the accident are well documented. In the paper we will present the time versus distance analysis for 10 such accidents. Two representative examples are shown in Fig.1 and Fig.2. In the first case in Fig.1 a lightning flash hit ground at a tennis court and about 50 meters away, a 35-year-old man leaned on an iron fence during a grill party. After the lightning event he complained that he does not have sense in his arms and legs. Also, a 39-year-old guest was complaining about pain in his left arm. A witness to the incident reported that the storm was far away and suddenly a loud bang was heard. This is confirmed in Fig.1, where it is seen, that there was no lightning located by the LLS within a range of 7 km before the accident.

Fig.1: Time-distance diagram – representation of detected CG discharges (blue) and IC discharges (orange) for ± 1 hour of the time of the accident and within a radius of 30 km (red arrow indicates the accident causing discharge).

A completely contrary case is shown in Fig.2, where five mountain bikers, age 17 to 26, suffered from light to medium injuries due to a lightning strike on a mountain site at an elevation the 1900 m. When the storm approached, they decided to take shelter in a small wooden cabin without lightning protection and this cabin was hit by lightning resulting in the injuries.

Fig.2: Time-distance diagram of CASE 2 (red arrow indicates the accident causing discharge)

In the full paper we will present eight more cases in a similar way and discuss a summary of the observed results. We could basically identify three groups of situations: (1) the accident causing lightning flash was the first one in the area and victims did not seek shelter because they were not aware of the danger, (2) the victims realized the danger but there was no safe place available reachable in short time (e.g. when hiking on a mountain), and (3) there was nearby lightning activity but victims ignored the risk and did not go to any safe place.

Attachments

Fig.1.png

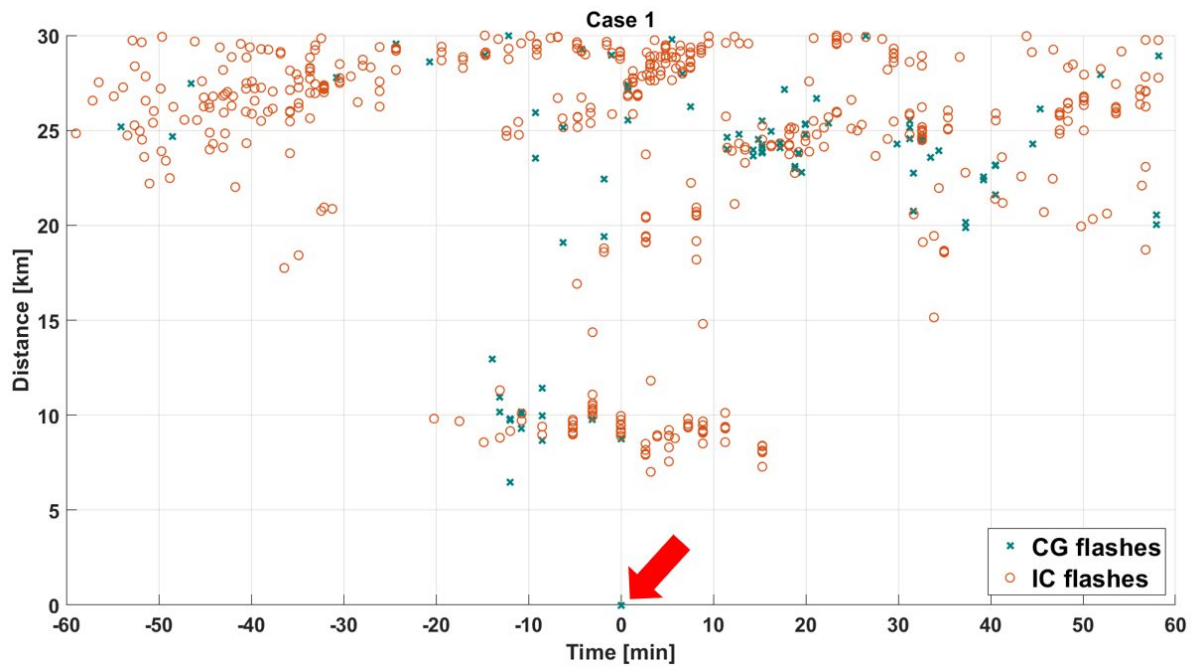
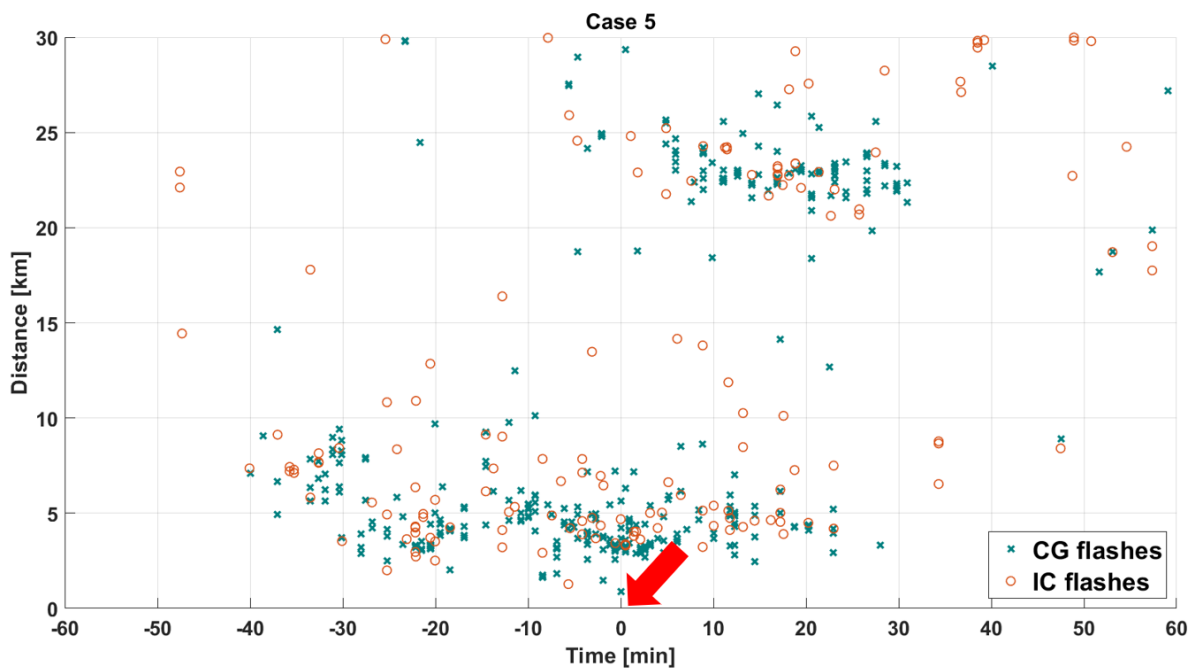


Fig.2.png



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Topic Areas

Applications of Lightning Data: Insurance Claims, Fire Risk, Mining, Wind Farms, etc.,
Lightning Safety, Protection, and Casualty Occurrence

Submission Format

No preference