

Abstract

In this dissertation a methodology of matching external ground-truth records of lightning events with data reported by a Lightning Detection Network (LDN) is investigated. The methodology allows for matching events where the time of the ground-truth record is unknown. It is shown that the location accuracy of an LDN is affected by the number of sensors that are able to detect lightning strokes and this observation is then used to define criteria for matching lightning strokes with LDN data. An evaluation of the methodology is presented in which the results of applying the methodology are compared with the results of a known methodology (time correlation) to determine if the same data is extracted. Photographs of lightning attachment to the Brixton tower in Johannesburg, South Africa are used as ground-truth events and LDN data is obtained from the South African Lightning Detection Network (SALDN). A practical application, in the context of an insurance claim scenario, is also presented in which the methodology is used to determine whether lightning is the cause of damage to a tree and when this may have occurred. It is found that the methodology extracts many of the possible strokes but that it also returns false positive results and makes some false exclusions. It is concluded that the proposed methodology should be used as a “filter” to reduce a dataset of LDN records but that corroborating evidence is required if the methodology is to be used as intended.