

## **Considering on the ground reflection effect on the electromagnetic fields due to lightning channel**

### **ABSTRACT**

Lightning electromagnetic fields are important issues for the evaluation of lightning induced overvoltage on power lines and for setting the appropriate protection level for power networks. Such electromagnetic fields are strongly dependent on lightning return stroke currents at different heights along the lightning channel. On the other hand, the ground reflection factor due to the difference between the return stroke channel impedance and the equivalent ground impedance at channel base can have an effect on the shape of the return stroke currents by entering additional reflected currents into the channel. In this paper, the effect of the ground reflection factor on the return stroke currents at different heights along a channel and the electromagnetic fields associated with the lightning channel at close distances are considered. Moreover, the behavior of the electromagnetic fields versus the reflection factor changes and the radial distance changes are considered and the results are discussed accordingly. The results illustrate that the reflection factor has a direct relationship with the values of the electromagnetic fields while this is usually ignored in earlier studies

**Keyword:** Lightning; Electromagnetic fields; Ground reflection factor