

Lightning in the atmosphere of Primordial Earth

Lightning is one of the most experienced and most severe phenomena on Earth and might be a possible trigger for the creation of life. But how likely was lightning in the early days of Earth (approx. four billion years ago).

The purpose of this master project is to understand which conditions were necessary to incept lightning discharges on Earth in its beginning. Therefore we need to understand the inception and motion of electron avalanches and of streamers, conductive, microscopic plasma channels forming the early stages of macroscopic lightning, in the atmosphere of Early Earth.

The project consists of literature study about the atmospheric composition of Primordial Earth, introduction of electronic collisions in a gas mixture, performing numerical simulations and conclusively post-processing of simulation results. The main goal of the master project is to determine which conditions were necessary to favour the formation of lightning on the primordial Earth.

We at DTU Space, located in Lyngby, study various phenomena related to lightning ranging from the very early microscopic conditions to macroscopic manifestations. Recently, we have started to understand the first stages of extraterrestrial lightning on Titan and which conditions are needed for the inception of lightning.

If we have caught your attention, please contact koehn@space.dtu.dk to obtain more information.