Mechanism of generating thunders

*Kozo Takahashi[1]

1.None

1. Mechanism generating thunders at middle latitudes
At middle latitudes, water drops in cumulonimbus change into ice crystals in the area where the temperature is about -10 deg. The melting temperature of a solid is lower on the surface than the inside, so at about -10 deg. the ice crystals are covered with liquid water film. The inside of the crystals there are free electrons and positive holes, and the electrons can move to the surface water, but the holes can't. So the water film is negatively charged, and the solid part of crystals is positively charged. In the cloud, the crystals collide with each other, the collision is approximately elastic one where lower than -10 deg., and the change of speed of the smaller crystals is larger than that of larger ones. Then the negative charge in the surface film on the smaller crystals moves to the larger crystal, and the smaller crystals become smaller and charged positive, are blown up to the cloud top, and make it high voltage. On the other hand, the larger crystals become larger, negative and drop down on the ground (Fig.1 & 2).
2. Mechanism generating thunders at low latitudes
At low latitude, in the cloud no water crystal exists, so the mechanism differs from that one at middle latitude. The top of thunderclouds has the voltage up to about 100 MV, by the mechanism stated in above Chap.1 (Fig.2), and the electrons and negative ions flow into the clouds from the ionosphere. As a result, the ionosphere has a few MV, so in the cloud upward electric fields of about 1 kv/m are generated. So, water drops are polarized such as the top is negative and bottom is positive. When they collide, the negative charge on the top of smaller water drops, which have higher speed than the larger ones, neutralizes the positive charge on the bottom of the larger water drops, and the smaller ones become positively charged and are blown up to the cloud top (Fig.3), resulting the high voltage.
3. Mechanism generating thunders in the smoke of a volcano
In the smoke billowing from a volcano, the lightning is observed, where ashes, cinders and blocks collide with each other, and where are charged by frictional electricity (Fig.3). By the same reason shown in chapter 2, the charge is polarized and high voltage in the upper part of the smoke is generated. As this high voltage is observed, the explanation mentioned above will be valid.
4. Earthquake prediction by observing electric fields (Fig.2)
The precursory seismic electric fields will be generated by the mechanism as follows:
(1) Before earthquakes, micro-cracks run in the source regions, and into these cracks pore water pours.
(2) Uranium compounds, radium compounds and radon, which exist in crystal boundaries, dissolve into the pore water.
(3) The cracks connect the pore water and spring water, and the radio active materials appear on the surface of source regions.
(4) The active materials ionize the lower atmosphere above the source regions, and the electric conductivity increases there locally and temporarily.
(5) The increase generates the current along the trace of cosmic shower between the surface and the ionosphere.
(6) As the current is intermitting and pulsating, it radiates wide band radio-waves, which are observed as the precursory waves.

Keywords: earthquake prediction, precursory seismic electric fields, thunder in middle-latitude, thunder in low-latitude , thunder in smoke of volcano

Fig.2 [A Negative Current in the Atmosphere]

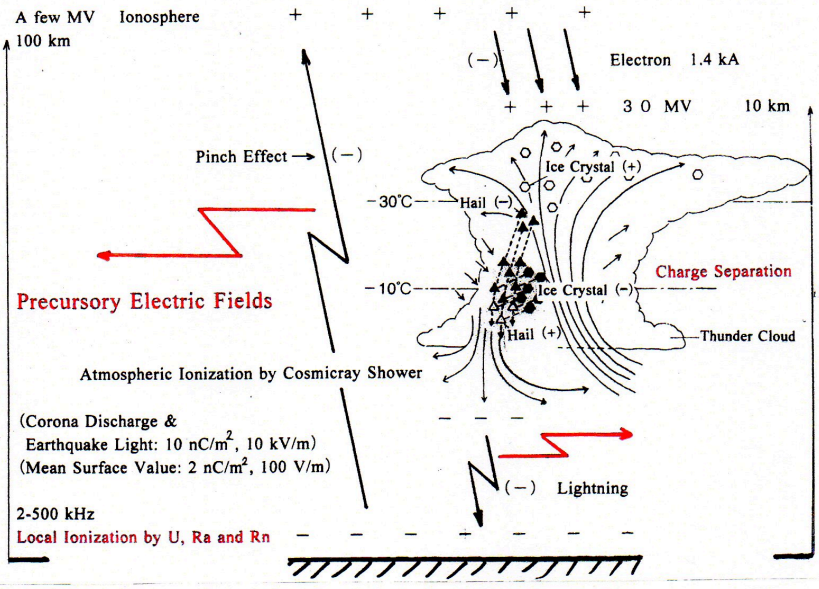

Fig.1

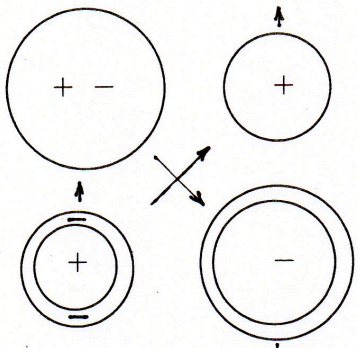

Fig.1 At middle latitude

Fig.3

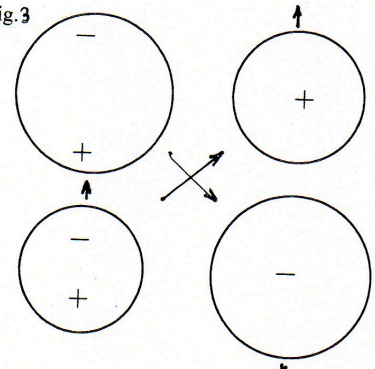

Fig.3 At low latitude

