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Detection of thermal anomaly associated with volcanic activity from MODIS data

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There are a lot of volcanoes in the world.And then, it is difficult to monitor all volcanoes because of costs.But we can monitor efficiently a lot of volcanoes using satellite remote sensing, because a volcanic activity will cause the increase in surface temperature and satellite (whose sensor can observe the surface temperature) remote sensing can cover a large area on surface.Therefore, various approaches have been suggested to monitor volcanic activities using remote-sensing satellite data.

Removing cloud pixel is essential to monitor volcanic activities using remote-sensing satellite data. Therefore, the purpose of this study is to remove cloud accurately and to develop an adequate algorithm continuously to detect thermal anomalies related to volcanic activities (especially lava activity which causes serious damages involve human lives) using MODIS (Moderate Resolution Imaging Spectroradiometer) infrared sensor onboard Aqua satellite.

We investigate spatial-time changes in thermal infrared in the statistical way. In order to detect only hotospots related to lava activities without faints, the developed algorithm investigates the difference temperature behavior between a target point and reference points, and we get spatial difference of brightness temperature (S). The presence of cloud causes large value of S that doesn't related to volcanic activities (Noguchi 2011). Therefore, removing cloud is essential in the proposed algorithm. To remove cloud, we use some BTD(Brightness Temperature Difference) which is sensitive to cloud. And we verified the technique of cloud removal as compared with Lidar data.

Keywords: MODIS, Lidar, Volcanic activity, Shinmoe-dake, lava activity