P-04

Using the Geo-KOMPSAT image analysis in detecting precursors of developing torrential rain clouds in summer season

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In this study, the major precursor phenomena were derived for detecting torrential rain clouds by intuitively analyzing satellite products. There were 60 cases of torrential rains in 2020 and 2023 in South Korea.

The precursor phenomena were derived for this study using multiple satellite images such as water vapor, RGB day/night composite, and secondary outputs from the GK-2A products.

We summarized major 9 possible check lists of key precursors that could become torrential rain clouds.

1. Updraft zone in front of the boundary of the upper dry area of North pacific High
2. Updraft zone in front of the dry area due to the trough of low pressure
3. Compressed wet zone between dry zone in front of the trough and the dry zone in the North Pacific High pressure zone
4. Warm advection accompanied by Low pressure in warm conveyor belt(WCB)
5. Lower cumulus clouds from strong southwesterly air stream (lower jets)
6. Cirrus cloud as divergent in the upper strong wind zone(in the case of lower-level convergence)

7. Upper layer cold core (localized heavy rain due to instability between upper and lower layers)

8. The cooling rate of the developing convective clouds

9. Clouds thickness of 10km or more (from the lower layer to the upper layer)

If five or more phenomena among the above 9 conditions are present, the clouds would be developed to cause heavy rainfall.

It is necessary to prepare for intense rainfall in summer by considering a combination of topographical factors.

Several dominant cases with satellite images and check lists were introduced.