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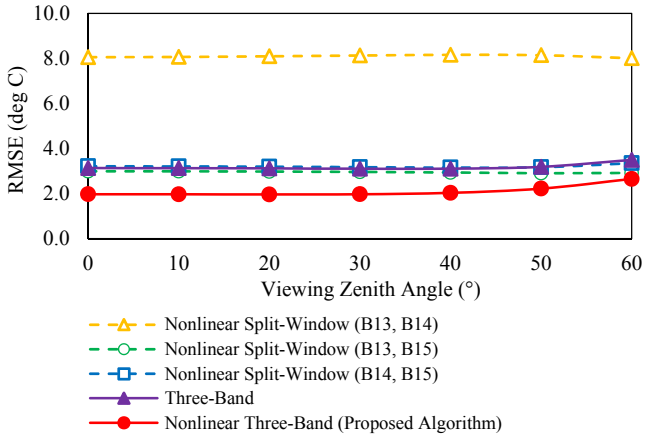

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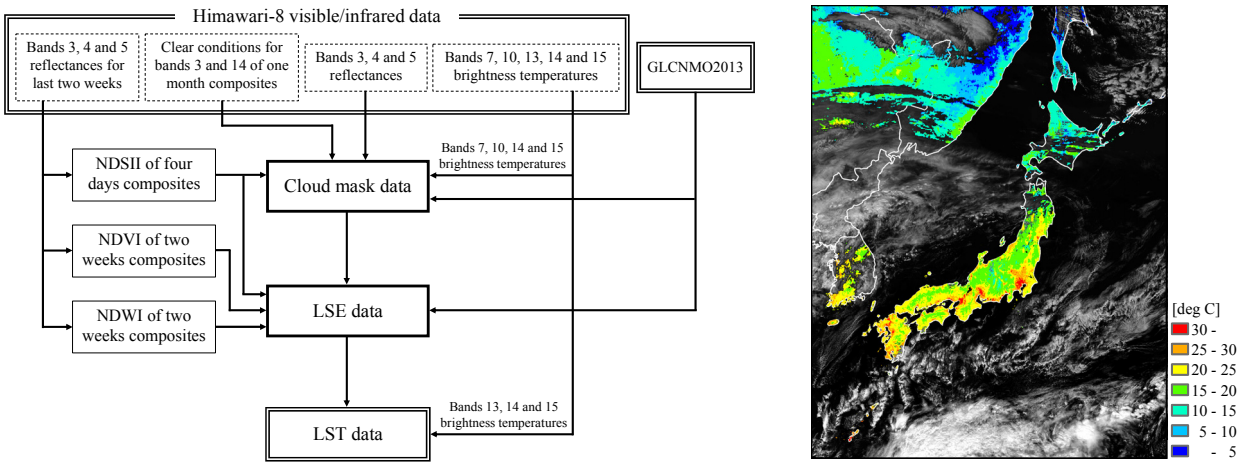
Figure 1. Comparison result of RMSE between different five retrieval algorithms of Land surface temperature (LST) for seven viewing zenith angles. RMSEs were calculated from sensitivity analysis that considered the uncertainties of brightness temperature (± 0.1 K), land surface emissivity (± 0.02) and precipitable water (± 0.5 g/cm^2).



↑ Figure 2. Flowchart for the operational LST-observation method (left) and example output of LST distribution over Japan area at 03:00 UTC, 26 October 2017 (right). Background image of right figure is the visible image of AHI band 3.

- A nonlinear three-band algorithm (NTB) was developed which makes the best use of these bands to estimate the land surface temperature (LST). The NTB requires the brightness temperatures and the land surface emissivities (LSE) for three thermal infrared bands as input data.
- It was shown that the NTB has the highest robustness against the uncertainties in input data compared with other retrieval algorithms (Figure 1).
- This LST retrieval algorithm is applicable to the clear-sky pixels. An operational LST-observation method is proposed in combination with newly constructed cloud masking and LSE estimation methods in this study (Figure 2).