The Visible Infrared Imaging Radiometer Suite (VIIRS), aboard the Suomi National Polar-orbiting Partnership (S-NPP) satellite, is the sensor to provide measurements of the atmospheric, land and oceanic parameters which are referred to as Environmental Data Records (EDRs). Land Surface Temperature (LST) EDR is the measurement of the skin temperature over global land coverage including coastal and inland-water. The LST EDR is derived from a baseline split-window regression algorithm. Coefficients of the LST algorithm are surface type dependent, referring 17 International Geosphere-Biosphere Programme (IGBP) types.

This study presents an evaluation of the provisional LST product based on the on-orbit VIIRS data. The evaluation is mainly carried out using two approaches including the conventional temperature-based approach by comparisons between the VIIRS LSTs and in-situ LSTs, and the radiance based simulation approach. The evaluation result shows an overall improved performance over beta maturity. However, provisional VIIRS LST presents a growing uneven performance over surface types, which strongly relies on a correct classification of the surface types. In addition, it is observed that the emissivity change within a surface type has great influence on the LST performance, which is particularly true for those regions with seasonally varying emissivity such as cropland. The further efforts are being made toward adjusting the emissivity setting in the algorithm development.