H34B-01: Validation Of TRMM For Hazard Assessment In The Remote Context Of Tropical Africa

Wednesday, 13 December 2017
16:00 - 16:15
New Orleans Ernest N. Morial Convention Center - 283-285

Accurate rainfall data is fundamental for understanding and mitigating the disastrous effects of many rainfall-triggered hazards, especially when one considers the challenges arising from climate change and rainfall variability. In tropical Africa in particular, the sparse operational rainfall gauging network hampers the ability to understand these hazards. Satellite rainfall estimates (SRE) can therefore be of great value. Yet, rigorous validation is required to identify the uncertainties when using SRE for hazard applications. We evaluated the Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Analysis (TMPA) 3B42 Research Derived Daily Product from 1998 to 2017, at 0.25° x 0.25° spatial and 24 h temporal resolution. The validation was done over the western branch of the East African Rift, with the perspective of regional landslide hazard assessment in mind. Even though we collected an unprecedented dataset of 47 gauges with a minimum temporal resolution of 24 h, the sparse and heterogeneous temporal coverage in a region with high rainfall variability poses challenges for validation. In addition, the discrepancy between local-scale gauge data and spatially averaged (~775 km^2) TMPA data in the context of local convective storms and orographic rainfall is a crucial source of uncertainty. We adopted a flexible framework for SRE validation that fosters explorative research in a remote context. Results show that TMPA performs reasonably well during the rainy seasons for rainfall intensities <20 mm/day. TMPA systematically underestimates rainfall, but most problematic is the decreasing probability of detection of high intensity rainfalls. We suggest that landslide hazard might be efficiently assessed if we take account of the systematic biases in TMPA data and determine rainfall thresholds modulated by controls on, and uncertainties of, TMPA revealed in this study. Moreover, it is found relevant in mapping regional-scale rainfall-triggered hazards that are in any case poorly covered by the sparse available gauges. We anticipate validation of TMPA's successor (Integrated Multi-satellitE Retrievals for Global Precipitation Measurement; ~10 km × ~10 km, half-hourly) using the proposed framework, as soon as this product will be available in early 2018 for the 1998-present period.

Authors

Elise Monsieurs *
Royal Museum for Central Africa
Université de Liège

Dalia Kirschbaum
NASA Goddard Space Flight Center

Jackson Tan
NASA Goddard Space Flight Center
Universities Space Research Association Columbia

Liesbet Jacobs
Vrije Universiteit Brussel
Royal Museum for Central Africa

Matthieu Kervyn
Vrije Universiteit Brussel

Alain Demoulin
Université de Liège

Olivier Dewitte
Royal Museum for Central Africa

Find Similar

View Related Events

Day: Wednesday, 13 December 2017