

Global 30m Height Above the Nearest Drainage

New elevation dataset normalized according to the local height found along the drainage network

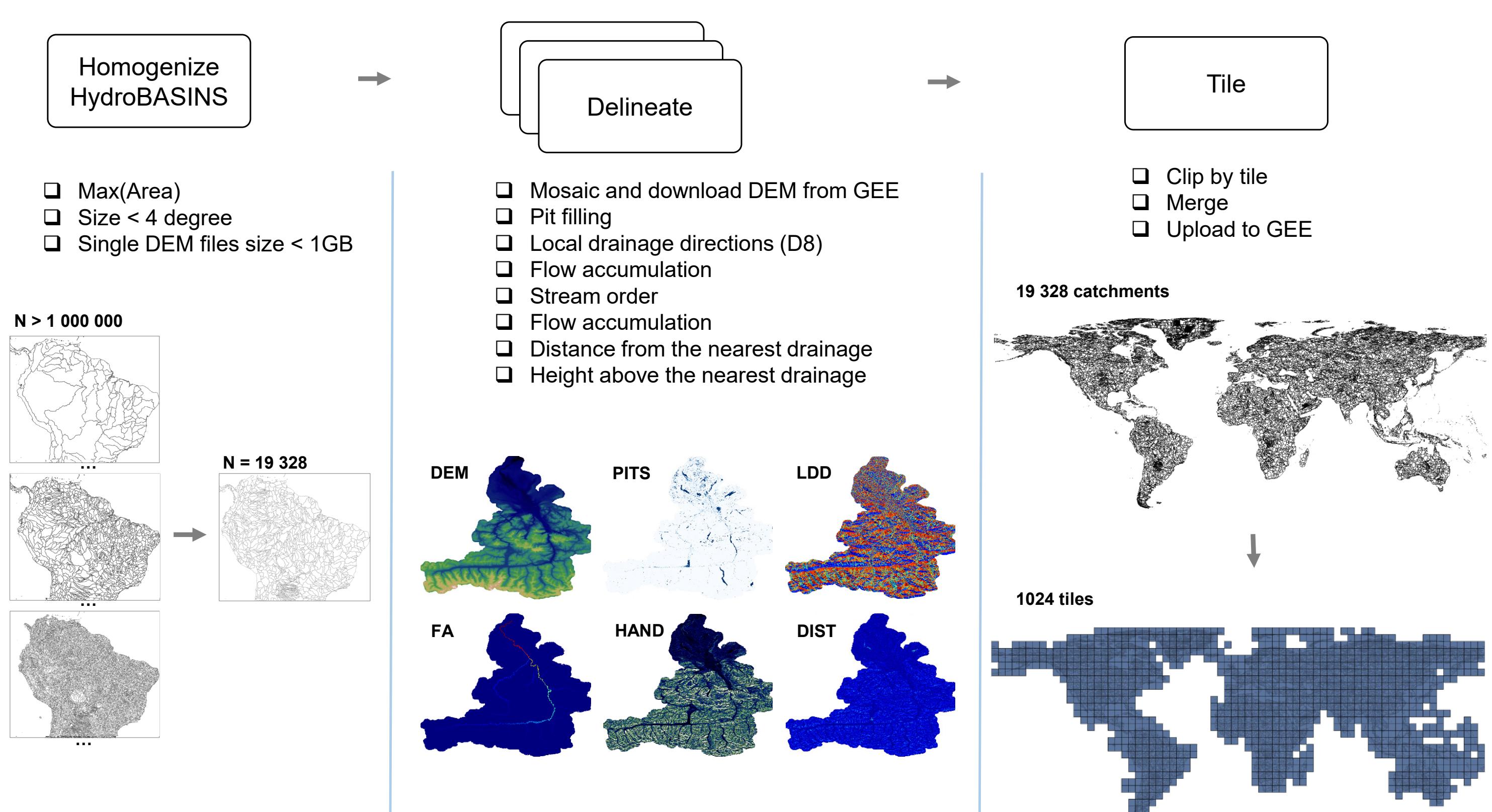
Introduction

The Height Above the Nearest Drainage (HAND) [1], a digital elevation model normalized using the nearest drainage is used for hydrological and more general purpose applications, such as hazard mapping, landform classification, and remote sensing. One of the essential characteristics of HAND is its ability to capture heterogeneities in local environments, difficult to measure or model otherwise. While many applications of HAND were published in the academic literature [4], no global scale HAND dataset was generated and analyzed yet, especially, using higher resolution DEMs, such as the new, one arc-second (approximately 30m) resolution version of SRTM.

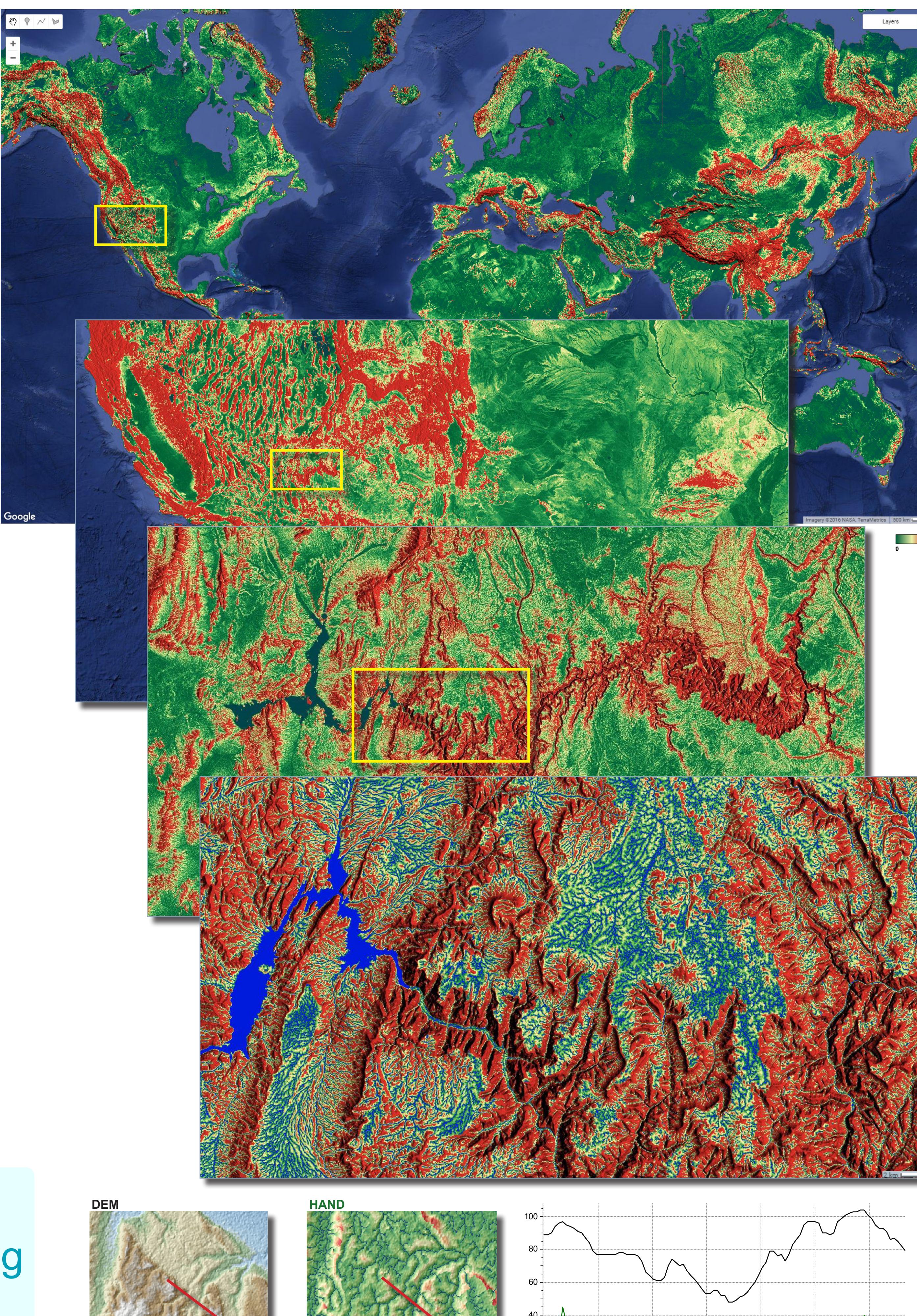
In this work, we present the first global version of HAND computed using a mosaic of two DEMs: SRTM (30m) and Viewfinder Panoramas DEM (90m). The lower resolution DEM was used to cover latitudes above 60 degrees north, where SRTM is missing.

To parallelize the processing a new homogenized, equal-area version of HydroBASINS [2] catchments was generated. New catchments boundaries were used to delineate DEM using a D8 method. The method used to compute HAND was implemented using PCRaster software, running on Google Compute Engine [4] parallel platform.

Method

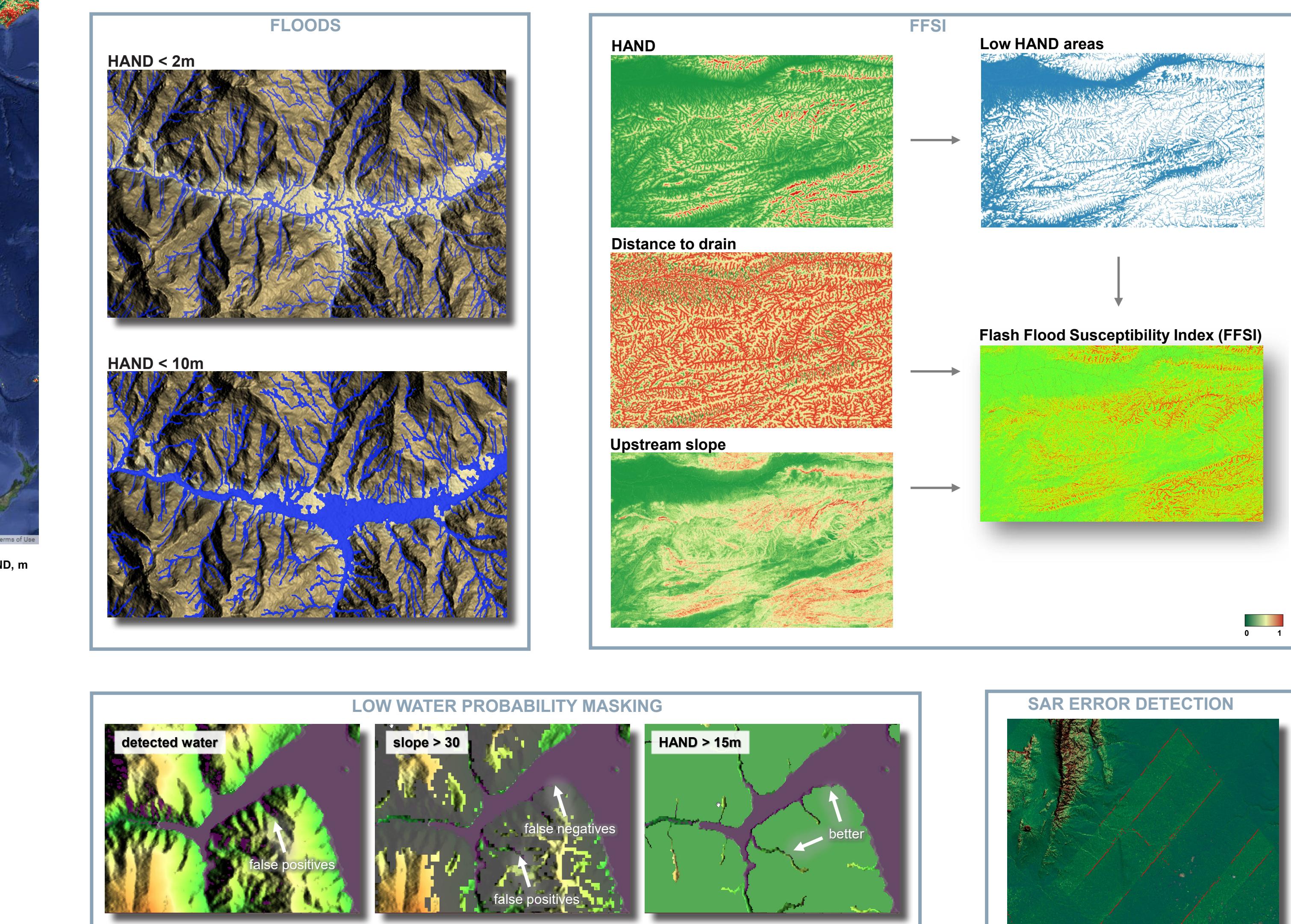


Results



Potential Applications

- Hydrological modeling: planform classification: valley, ecotone, slope, plateau
- Remote sensing: likelihood of water, hill shadow correction, local error correction
- Flood hazard mapping
- Flash flood prone area mapping: Flash Flood Susceptibility Index (FFSI)



Next

- Better river head detection
- Improve quality for >60N
- Release as Google Earth Engine Asset, concat now for beta testing!
- Filter noise (apply Landsat-based water mask)
- Planform classes (valley, ecotone, slope, plateau)
- Publication

References

1. Nobre, A. D.; Cuartas, L. A.; Hodnett, M.; Rennó, C. D.; Rodrigues, G.; Silveira, A.; Waterloo, M.; Saleska, S. Height Above the Nearest Drainage – a hydrologically relevant new terrain model. *J. Hydrol.* 2011, 404, 13–29.
2. Lehner, Bernhard, Kristine Verdin, and Andy Jarvis. "New global hydrography derived from space-borne elevation data." *EOS, Transactions American Geophysical Union* 89.10 (2008): 93-94.
3. Gharari, S., et al. "Hydrological landscape classification: investigating the performance of HAND based landscape classifications in a central European meso-scale catchment." *Hydrology and Earth System Sciences* 15.11 (2011): 3275-3291.
4. Gorelick, N. Google Earth Engine. *AGU Fall Meet. Abstr.* 2012, 15, 11997.

Conclusions

- HAND dataset is generated and available for testing
- Dataset size: ~1.5TB
- Website: <http://global-hand.appspot.com>

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<http://bit.ly/global-hand>

