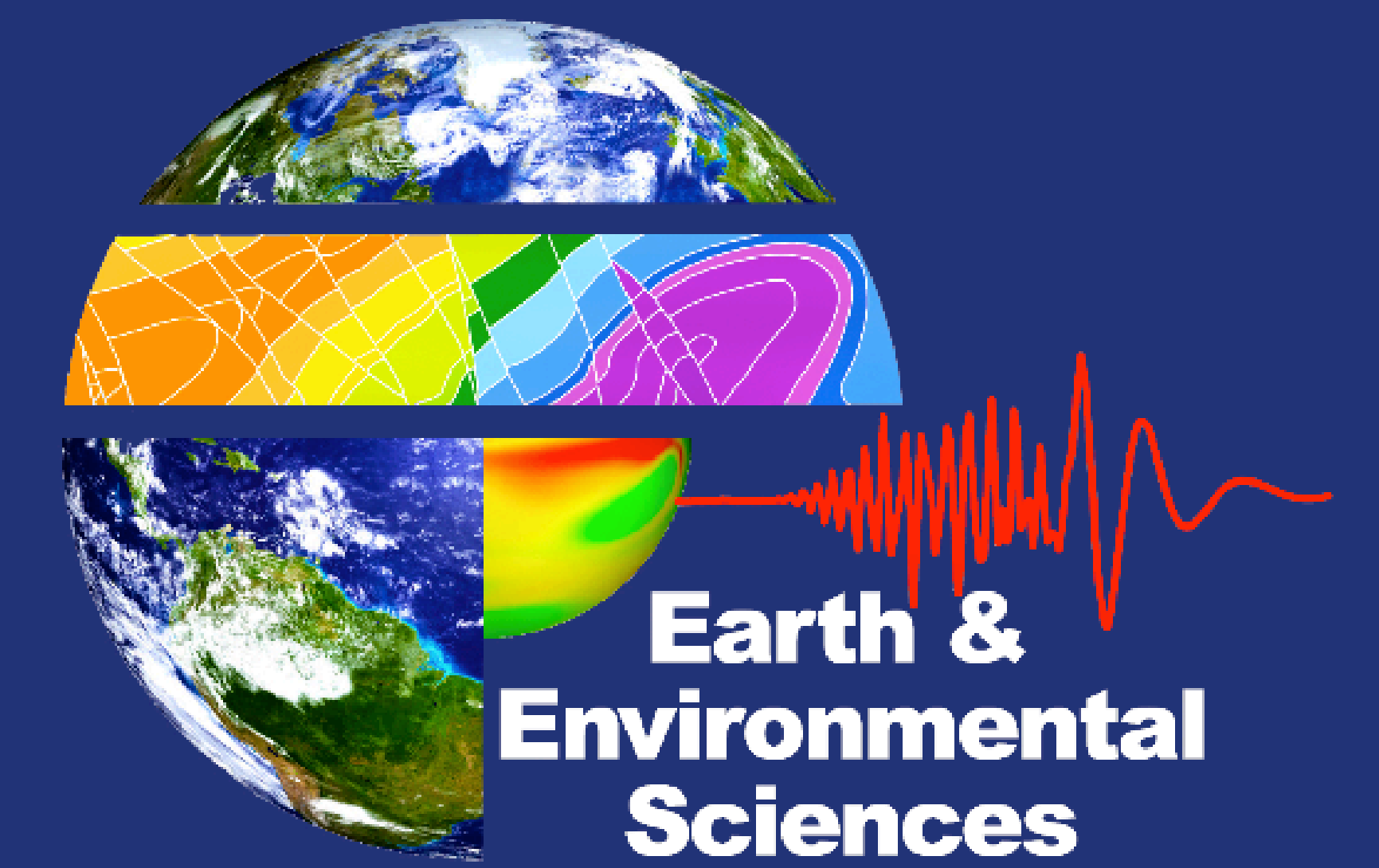


Veins of the Earth: a Flexible Framework for Mapping, Modeling, and Monitoring the Earth's River Networks

Jon Schwenk¹, Jemma Stachelek¹, Katrina Bennett¹, Elizabeth Prior^{1,2}, Tal Zussman^{1,3}, Joel Rowland¹
¹ Los Alamos National Laboratory, EES-14, Los Alamos, NM, ²Virginia Tech University ³Columbia University



What is VotE?

A fusion of global-scale, river-centric datasets and tools for rapid analysis and modeling frameworks

Our Vision

Create a scientific grade, functional, and information-rich living map of the Earth's surface water pathways *without* sacrificing precision for extent.

Navigating this poster

Why VotE? : Why VotE was conceived

Fusing datasets : Which datasets have we ingested, and how do we do it?

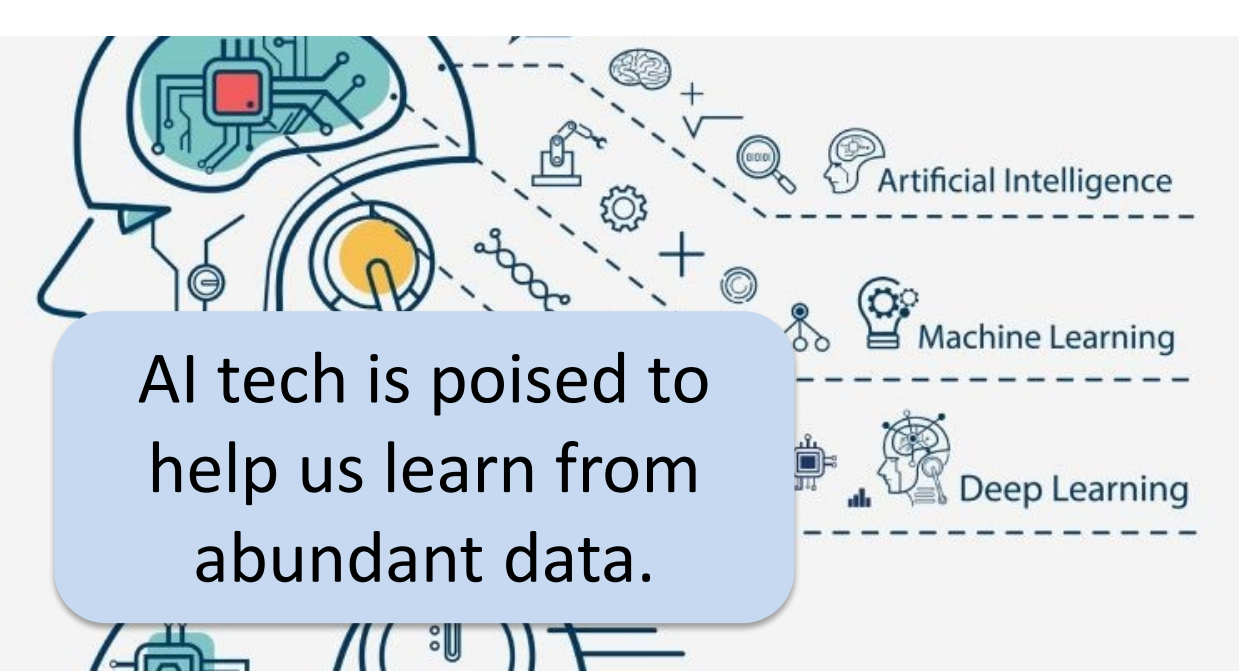
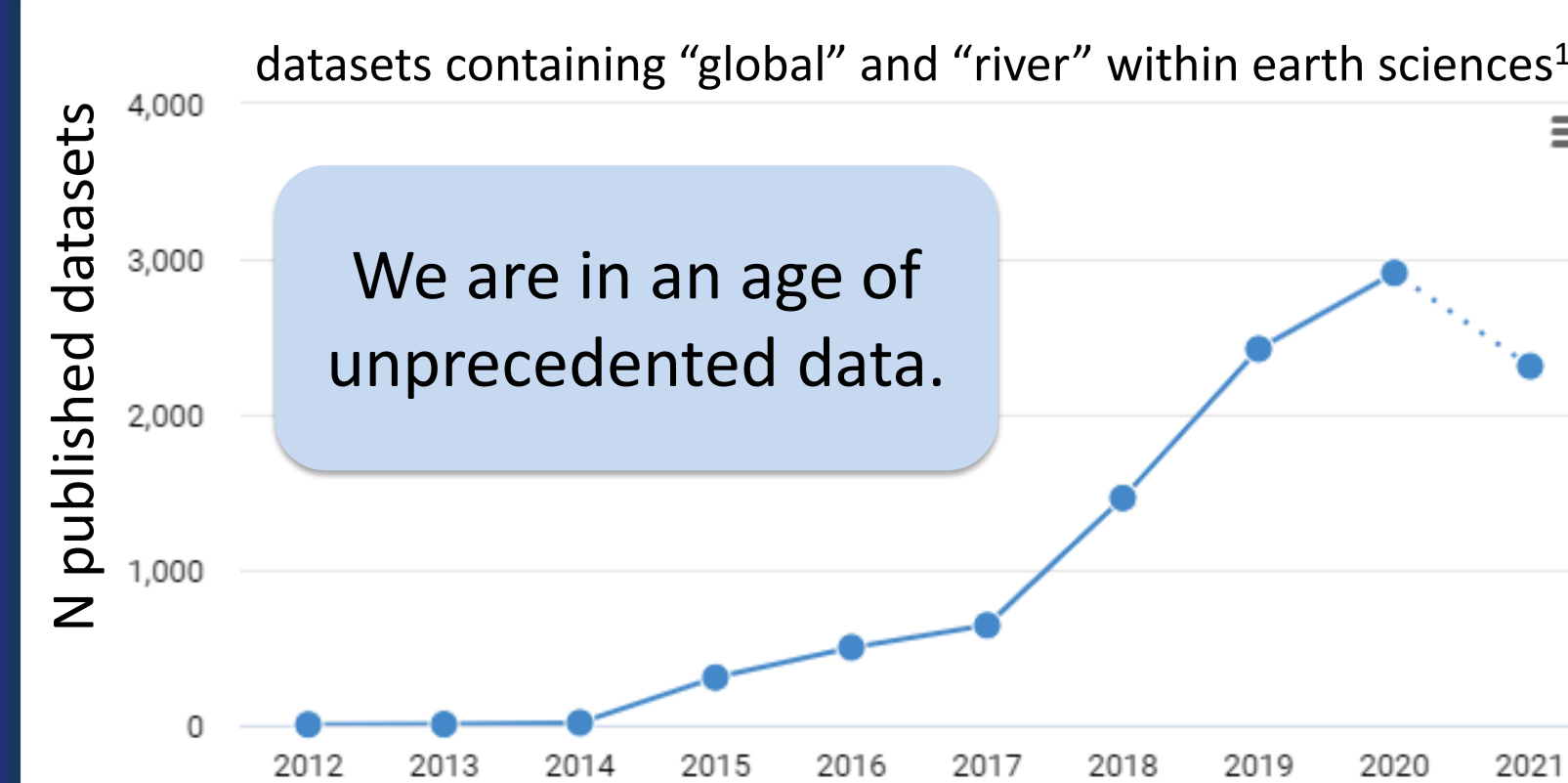
Building the backbone : How we generate river networks and associated drainage basins on a global DEM

Rapid analysis : Global comparison of two independently-estimated width products using VotE

Model building : How VotE can export various river-watershed model frameworks

Forcing data and features : How we parameterize watersheds and generate forcing data

Why VotE?



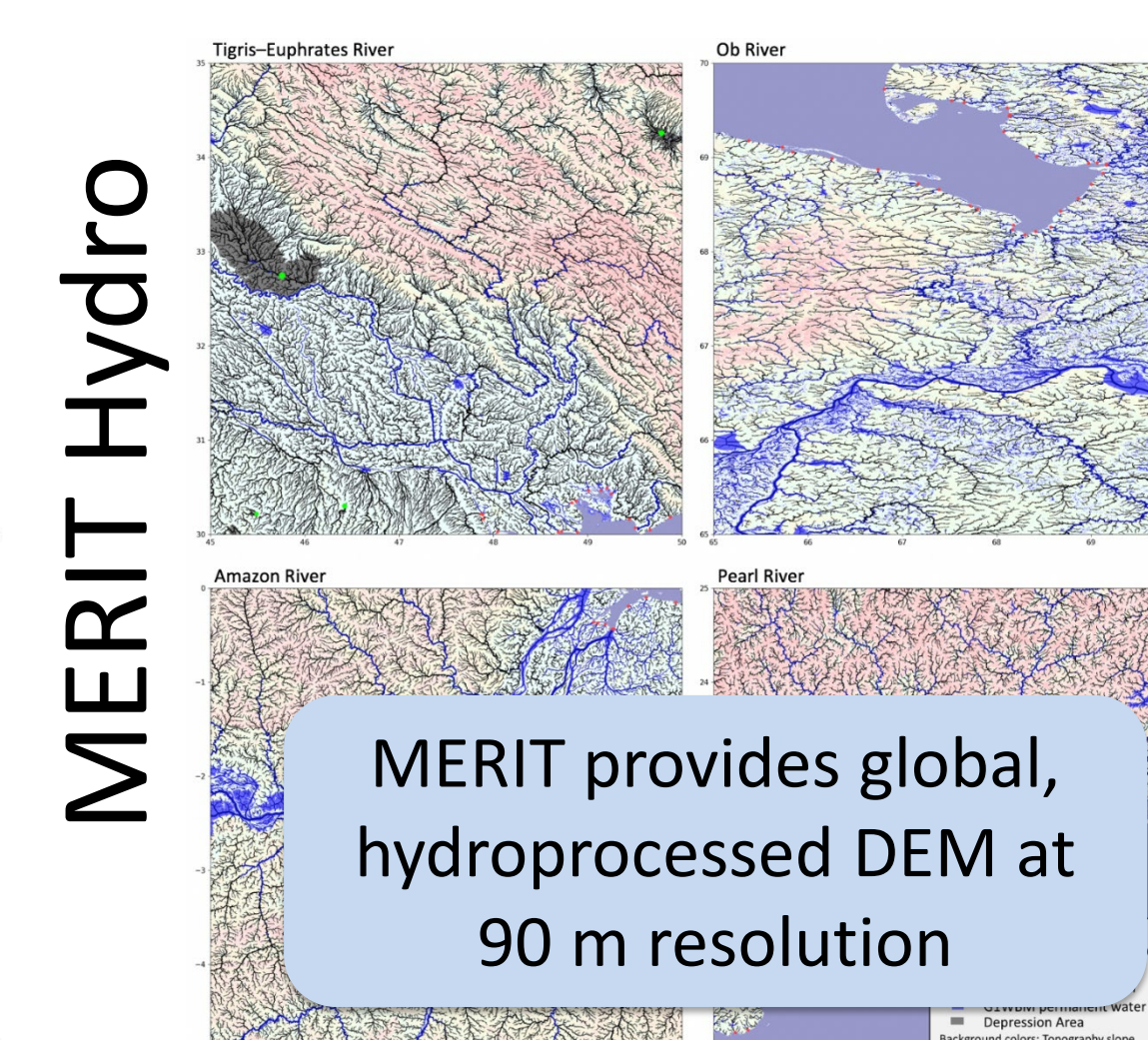
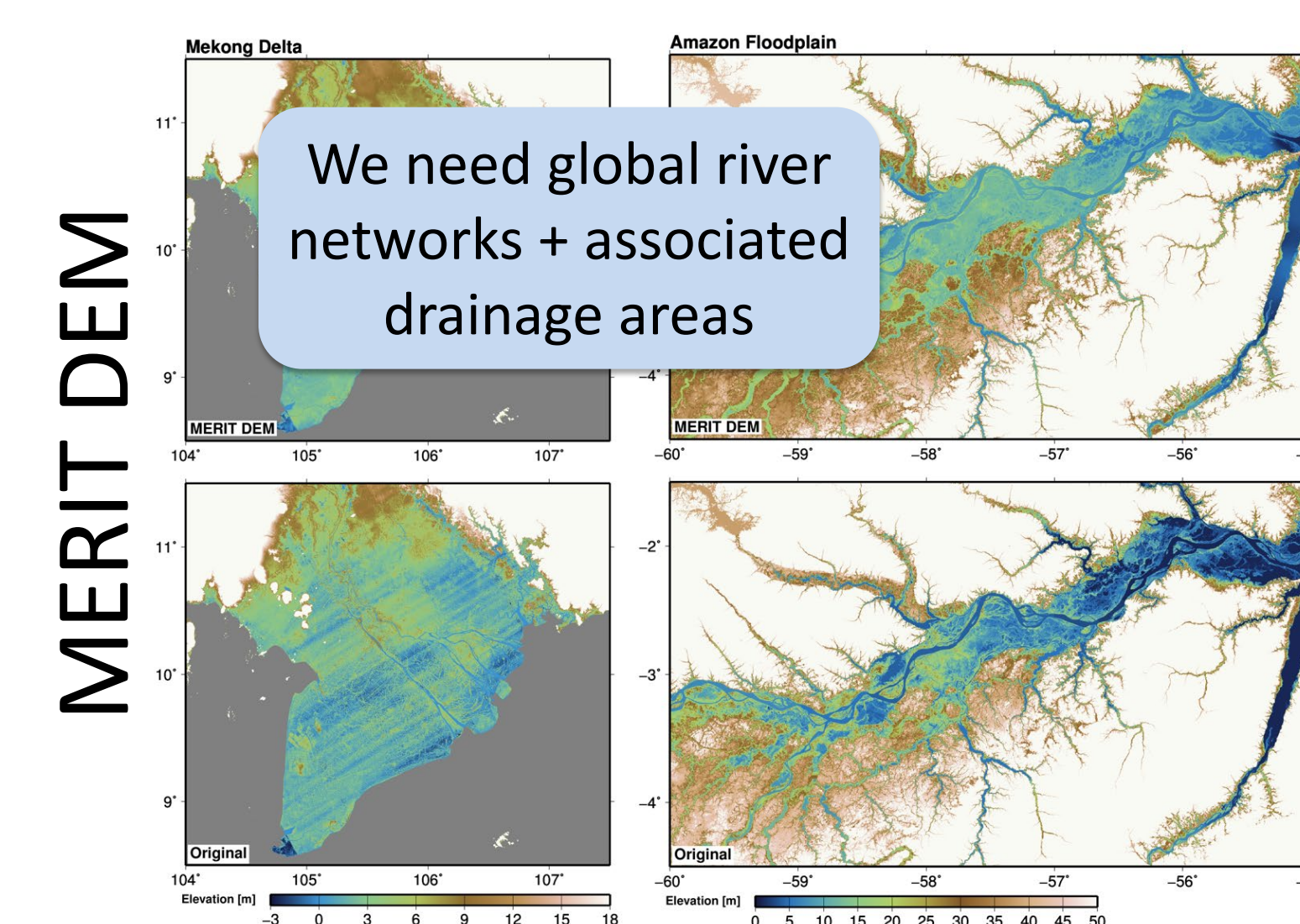
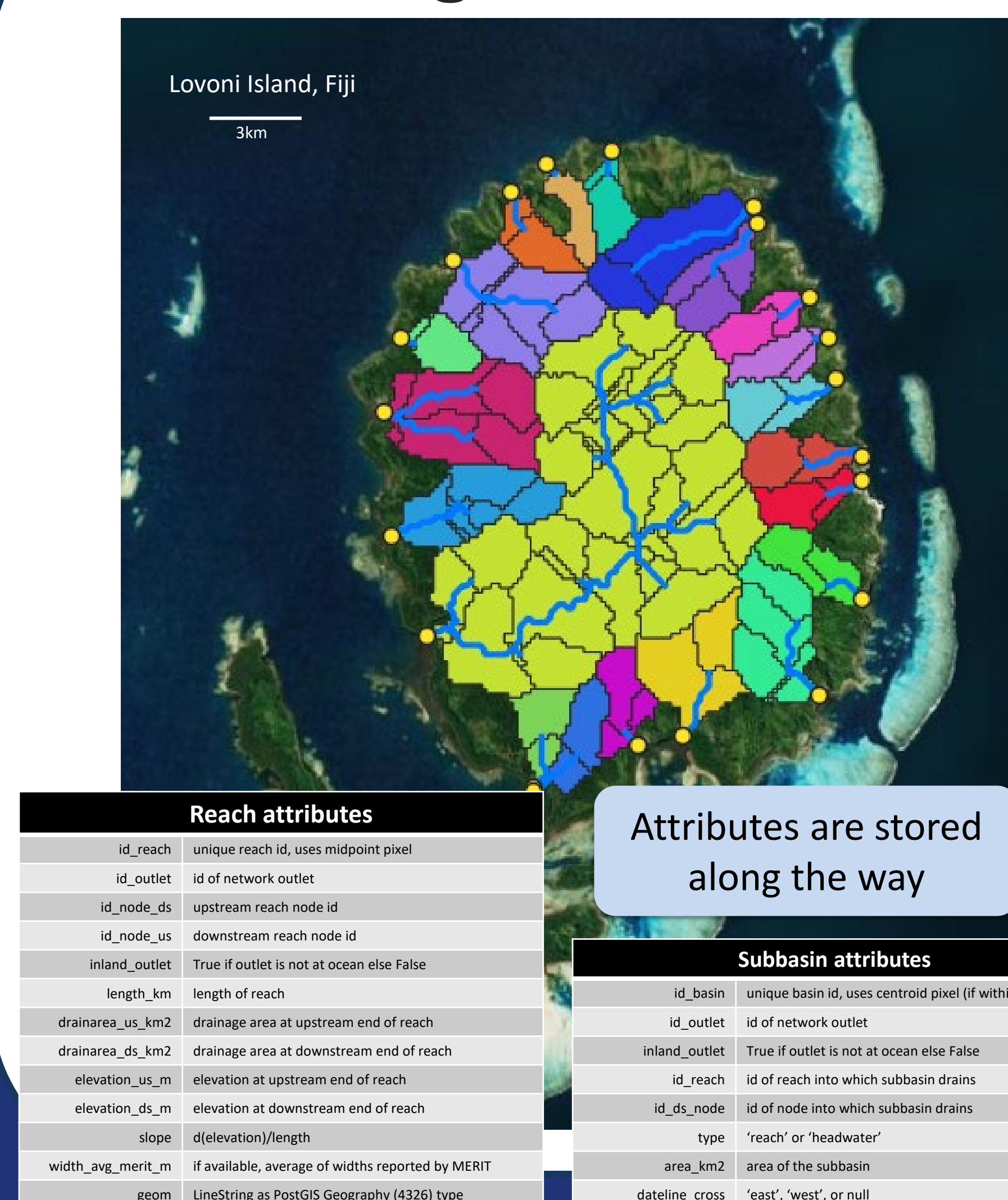
...but is it **usable** and **trustworthy**?

...but are the data ready for AI?

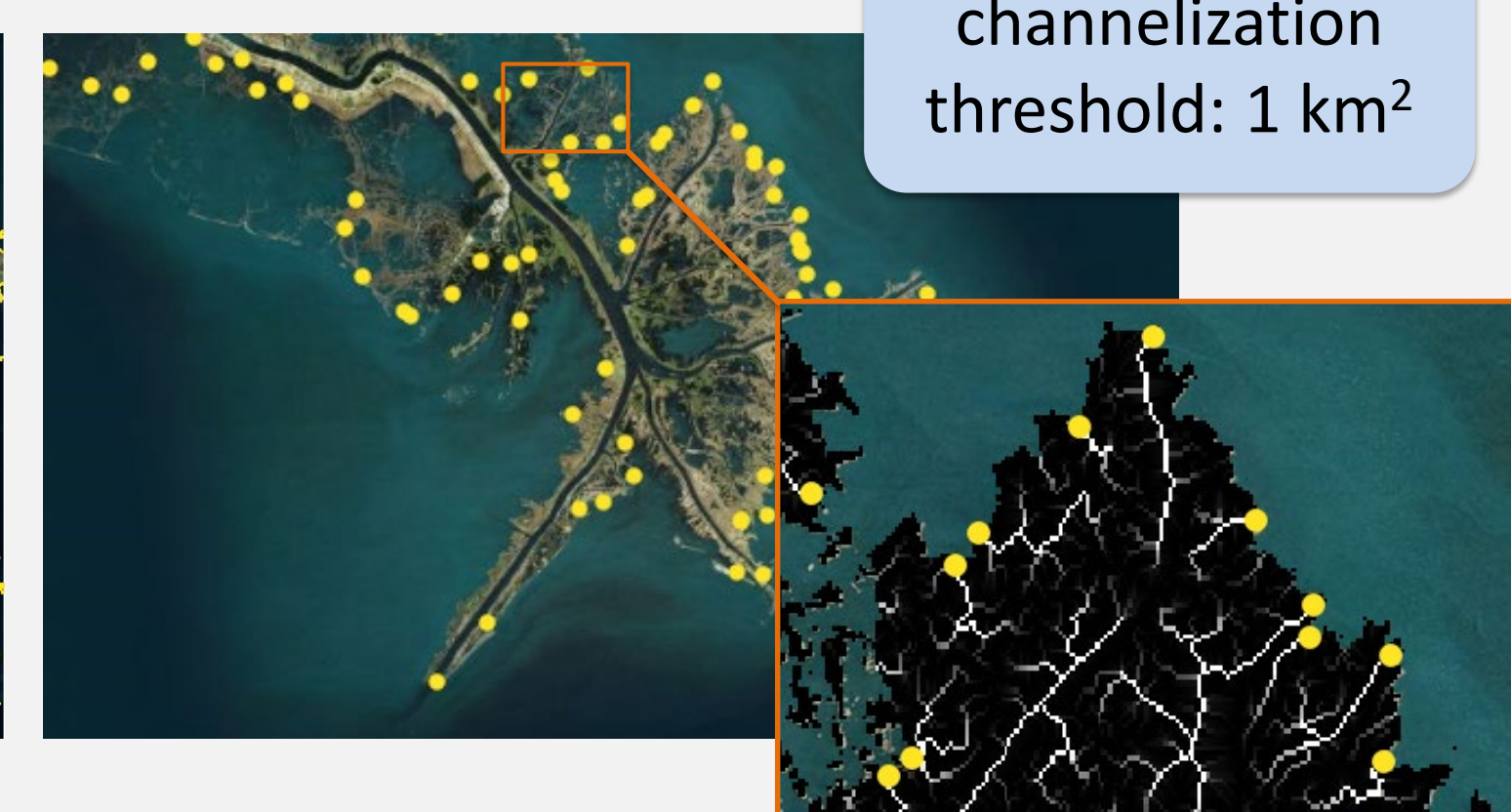
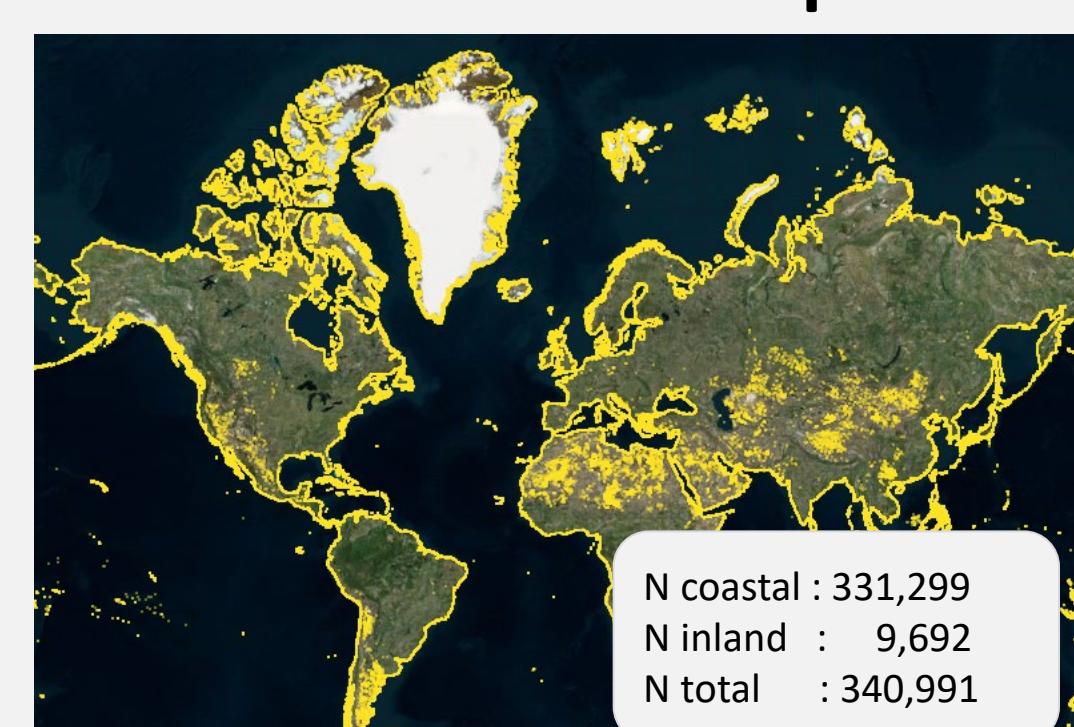
Data scientists know that the vast majority of effort to build AI models lies in the collection, curation, and alignment of data. Advances in AI insights are limited by data prep. VotE is an example of how we can synthesize datasets by mapping each to a common "grid." It serves as a platform that enables multiscale, feature-rich **model-building**, **rapid dataset benchmarking**, and is flexible to modifications and new data streams.

¹<https://app.dimensions.ai/discover/publication>, image from <https://www.readspeaker.ai/blog/deep-learning-vs-machine-learning/>

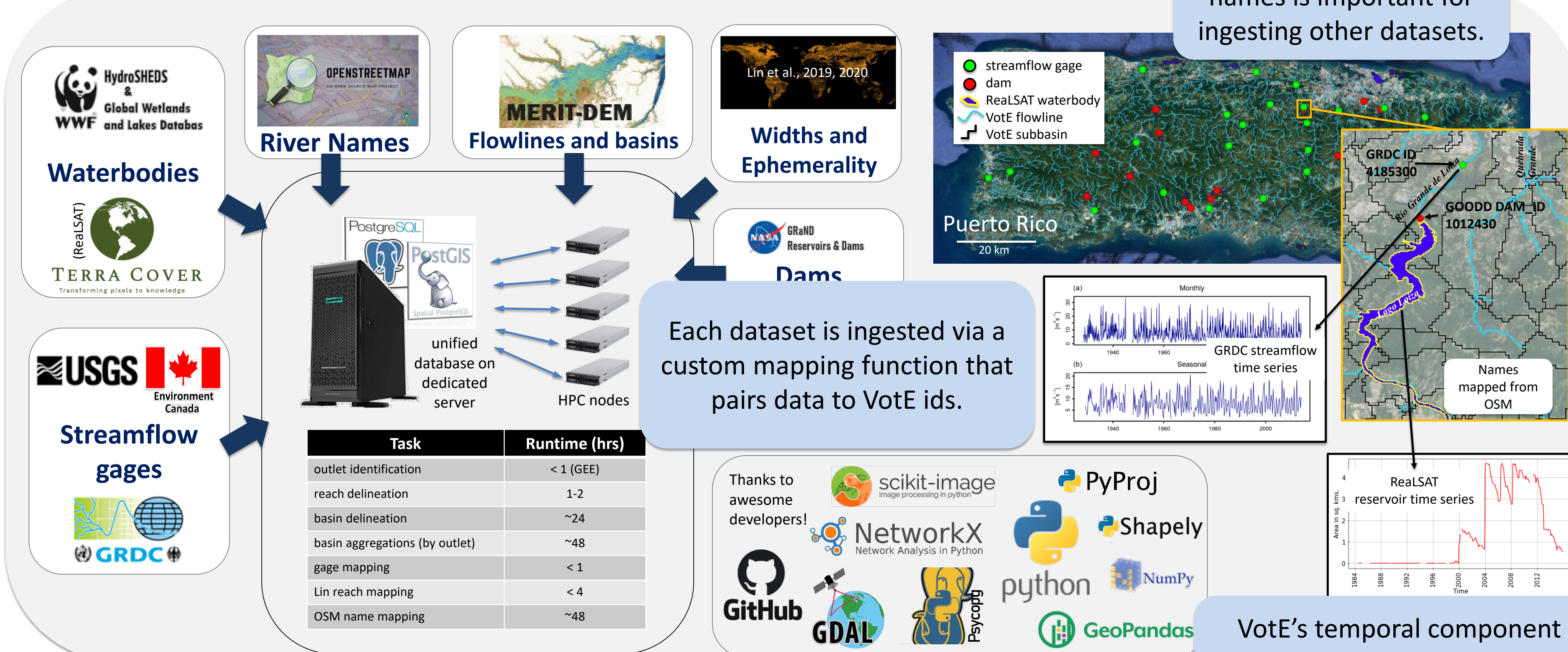
Building the Backbone



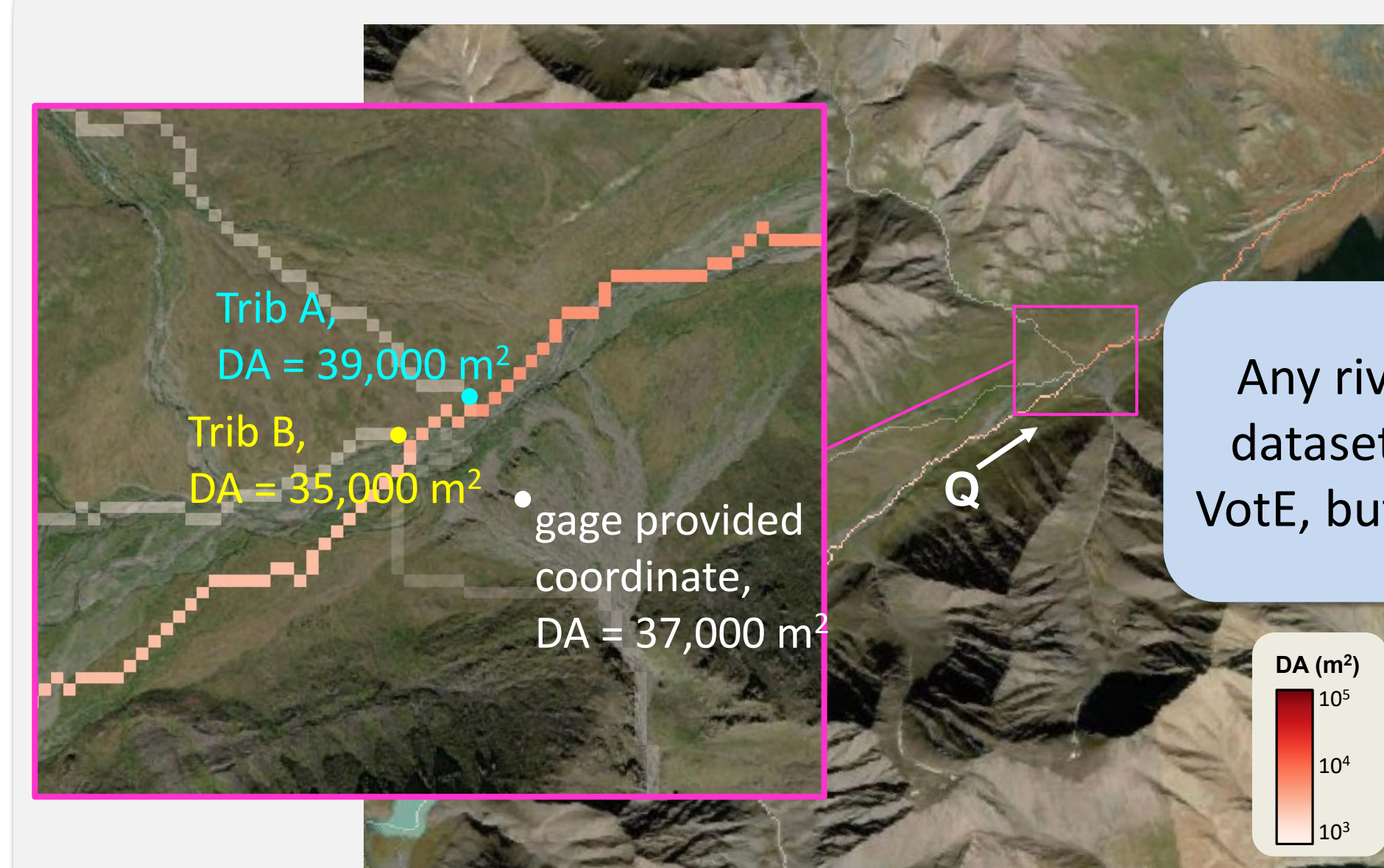
Step 1: outlets



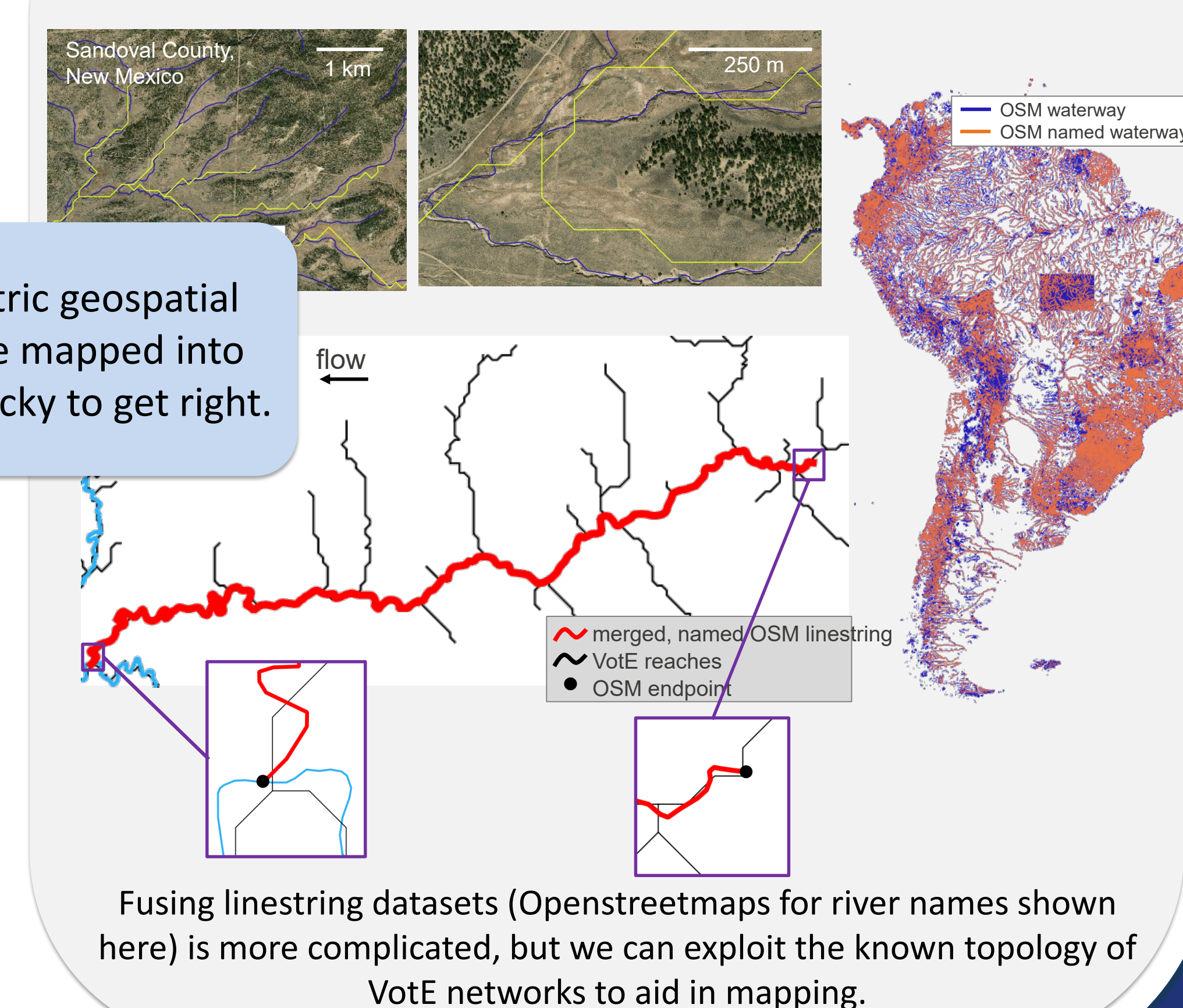
Fusing Datasets



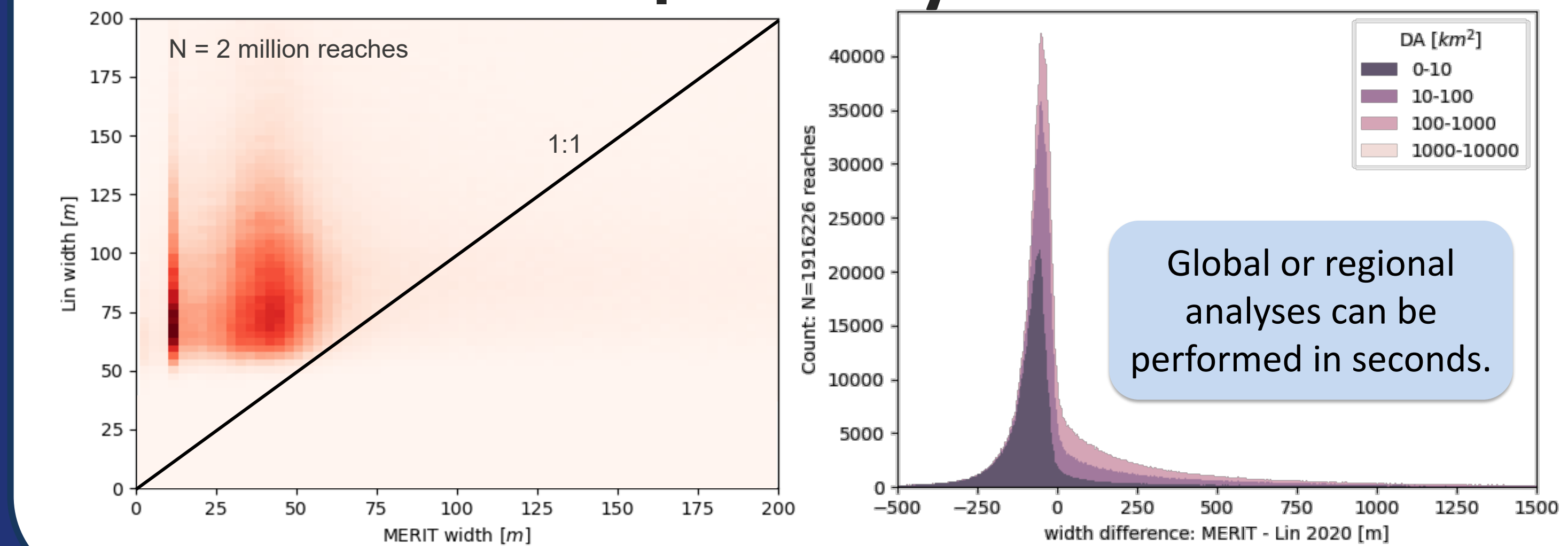
point-to-linestring



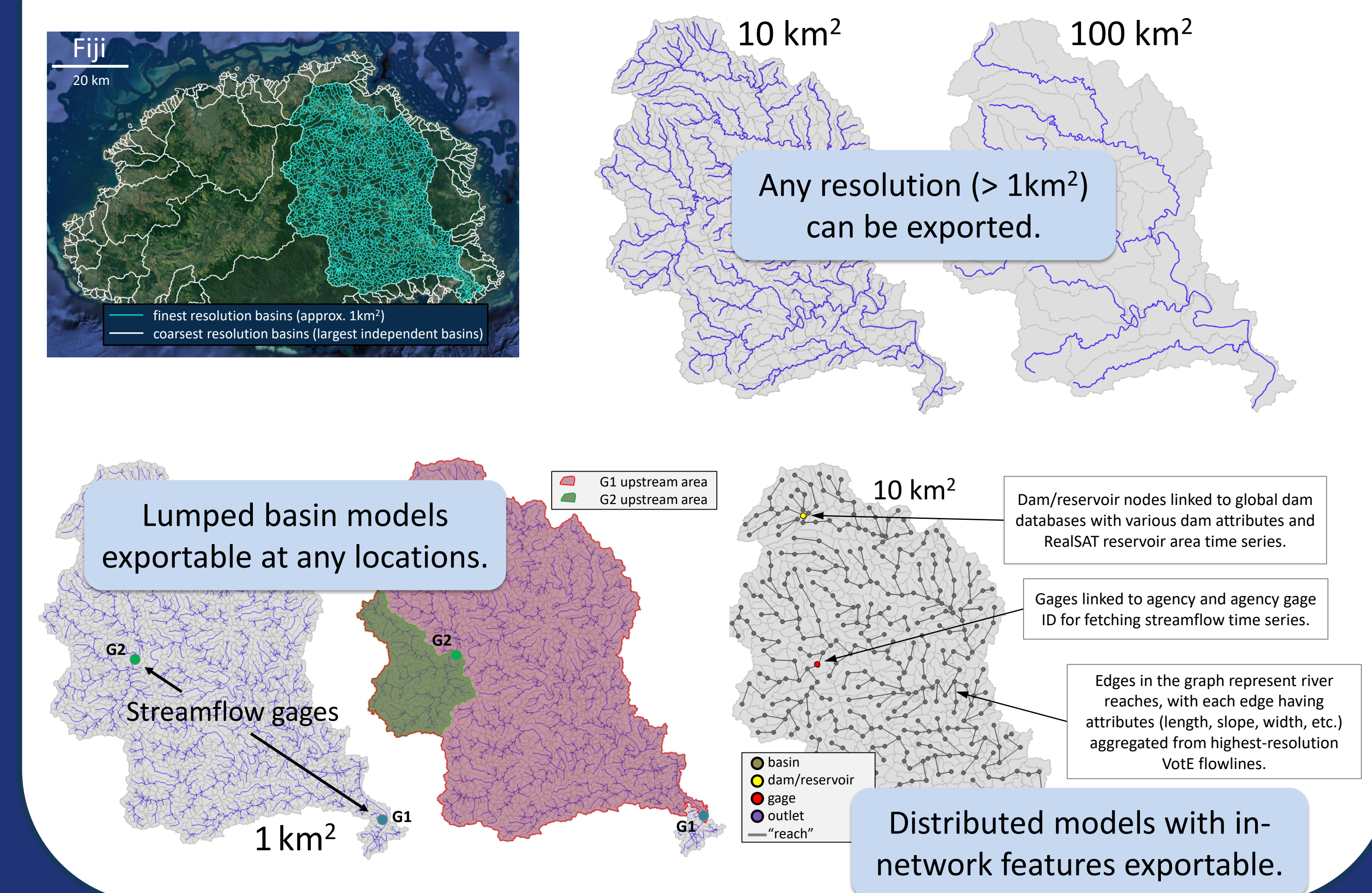
linestring-to-linestring



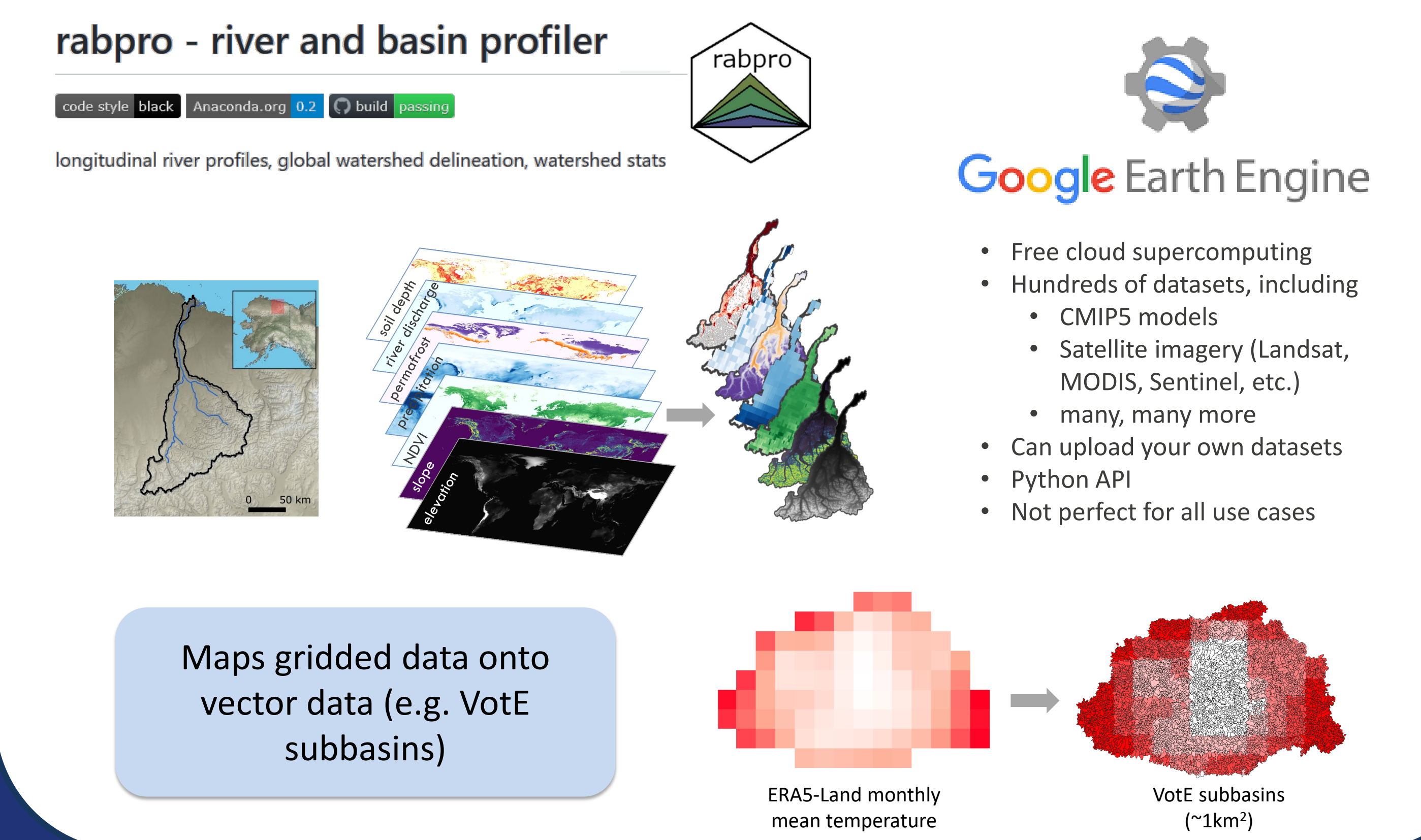
Rapid analysis



Model building



Forcing data and features



Use and Contact

VotE is not currently openly available, although we hope to eventually provide it via web portal. However, we are eager to pursue exciting ideas with collaborators. E-mail jschwenk@lanl.gov if you're interested!