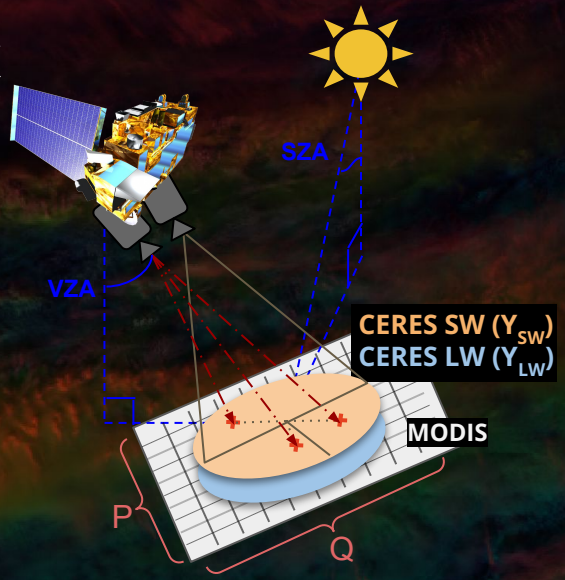
Estimating CERES-based Broadband Flux from 1km MODIS observations

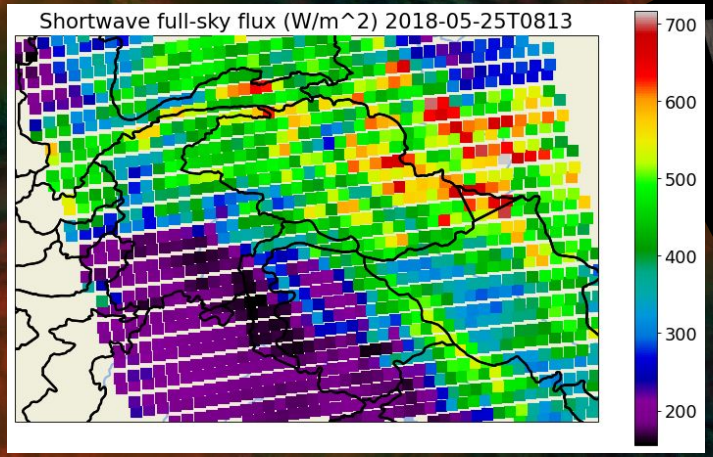
Presented by Mitchell Dodson

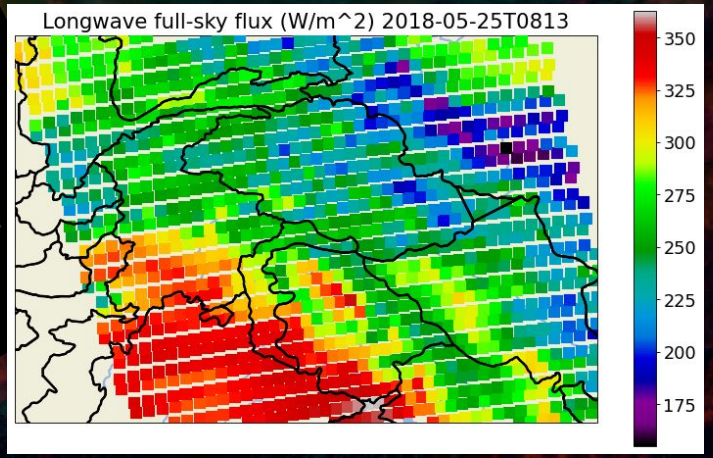
The EOS satellites Terra and Aqua carry a broadband sensor called **CERES**, and a 36-channel narrow-band sensor, **MODIS**.

CERES has **~16x24km** resolution; MODIS has a **~1km^2** resolution.

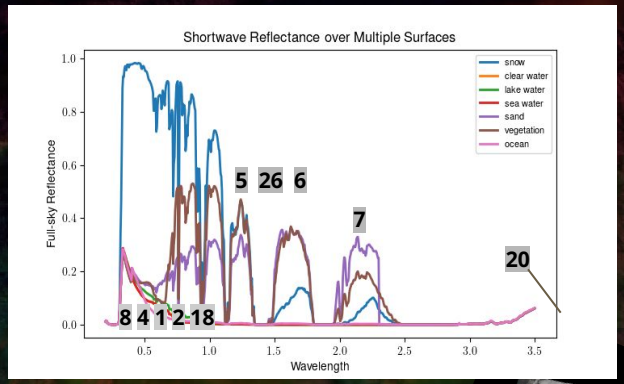
Since CERES and MODIS can be directly co-located, my hypothesis is that the 1km MODIS pixels can be used to predict the broad-band fluxes observed by CERES at their finer spatial scale.

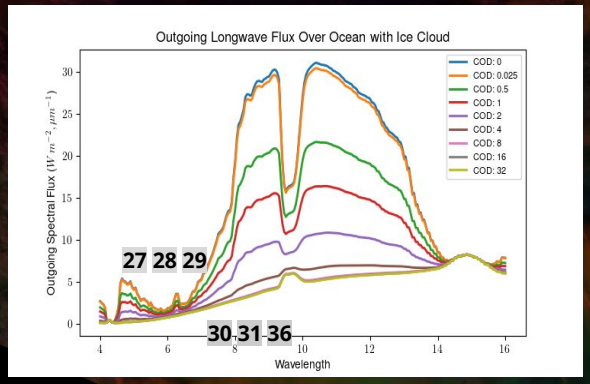


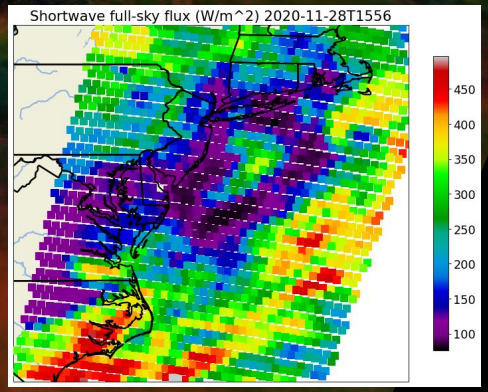


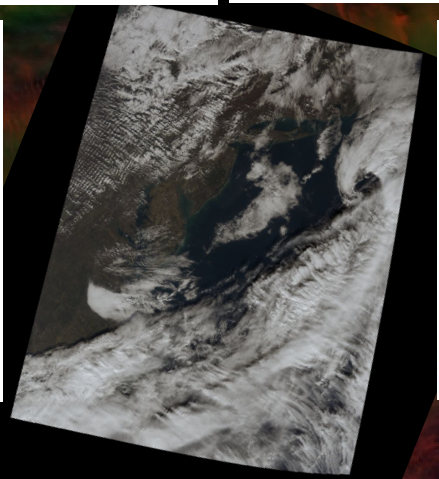


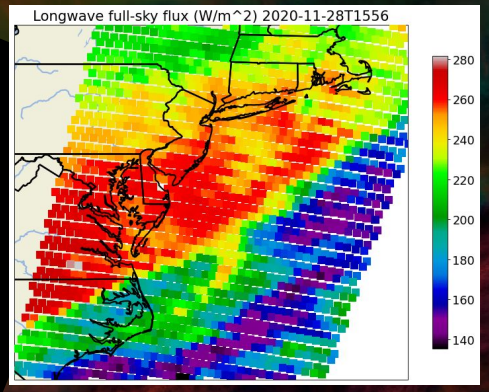
Flux versus spectral radiance











Flux: ($W\,m^{-2}$) ; Spectral radiance: ($W\,m^{-2}um^{-1}sr^{-1}$)

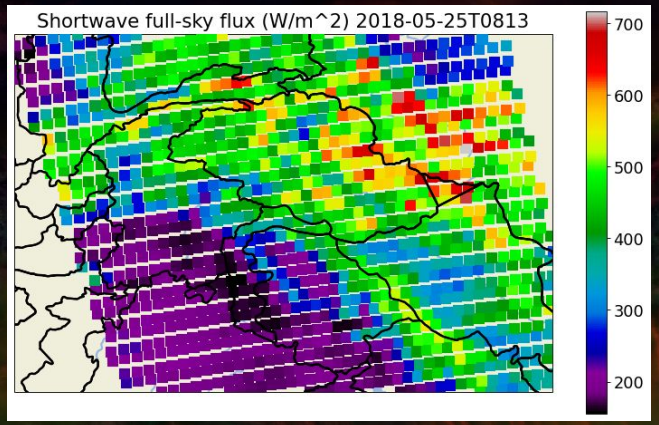
Hindu Kush Himalaya

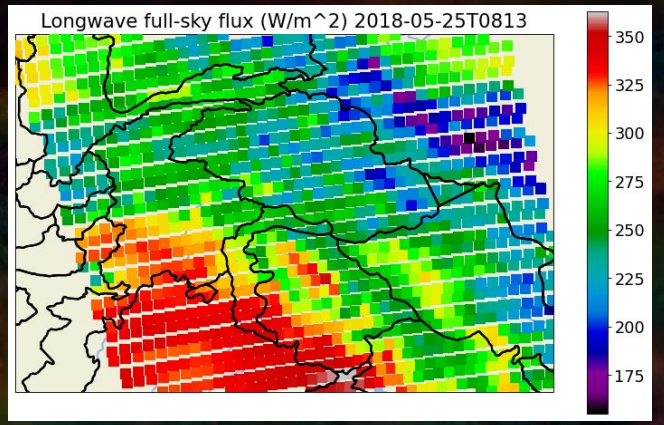
lat:[32,38] lon:[69,79]

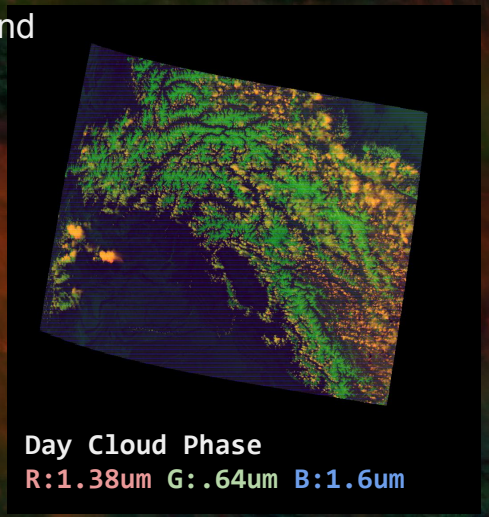
Mountainous region including borders between Afghanistan, Pakistan, and Tajikistan

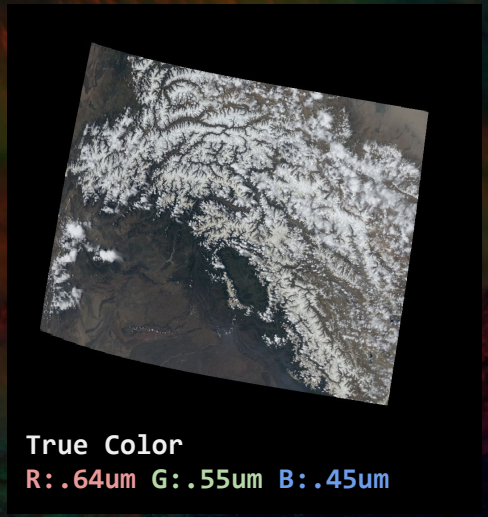
Common surfaces:

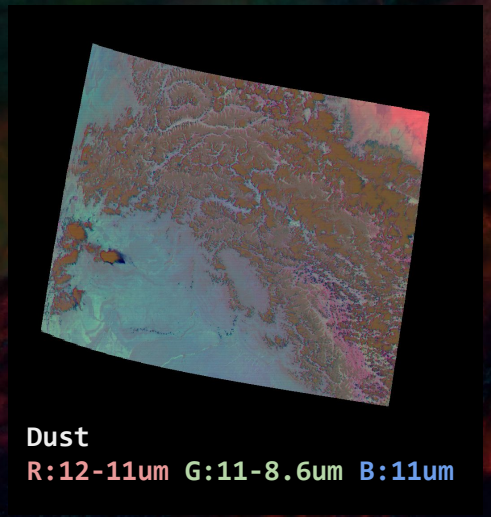
- Year-round snow caps with seasonal variation in extent
- Vegetation
- Barren and desert land surfaces.
- High-altitude clouds











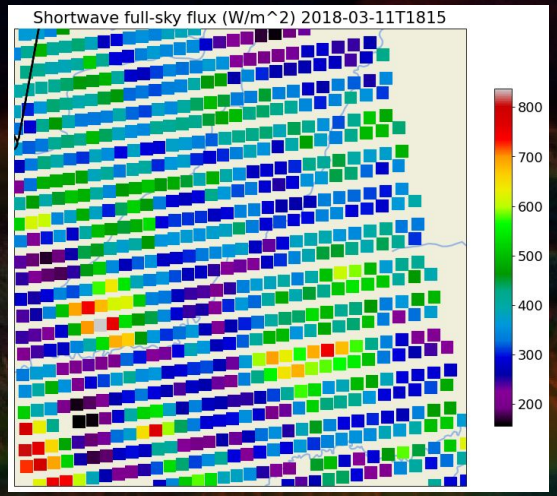
Amazon Rainforest

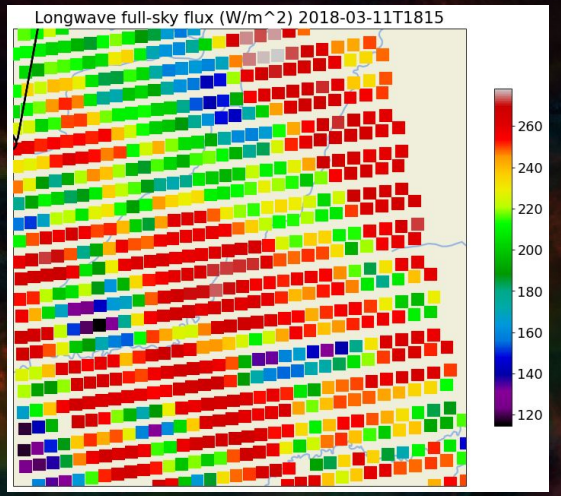
lat:[-3,-8] lon:[-65,-75]

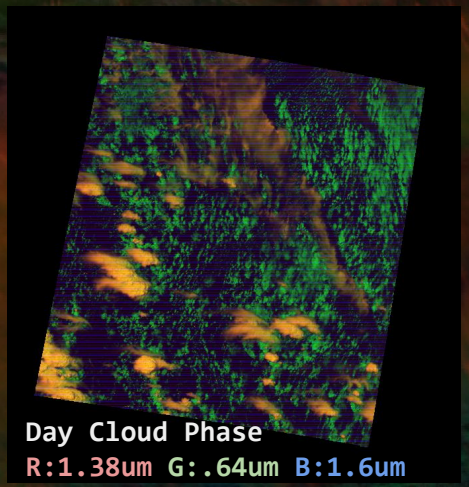
Densely forested and largely undeveloped region of Northern Peru, just south of the equator

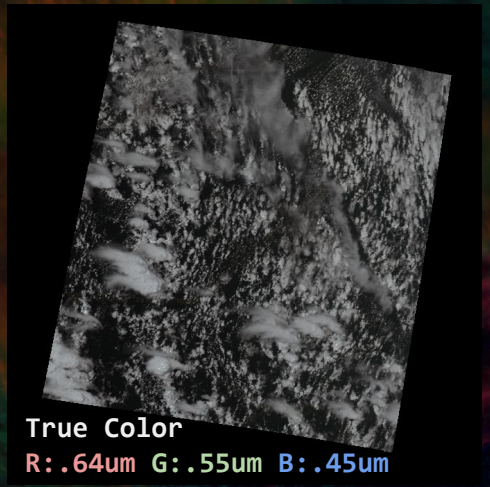
Common surfaces:

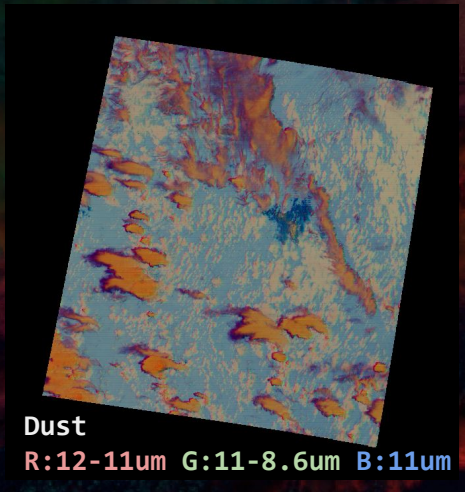
- Deep tropical convective systems
- Numerous small cumulus clouds
- Dense vegetated surfaces
- Cirrus clouds
- Biomass burning smoke











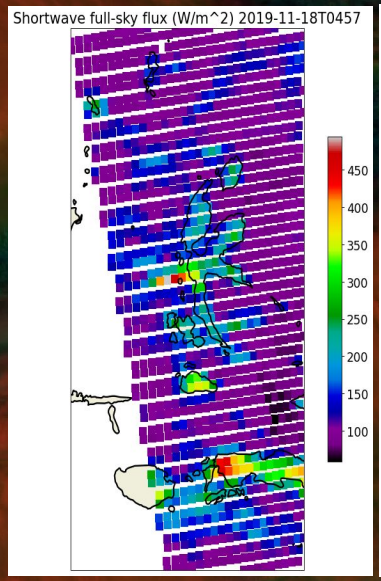
Indonesia

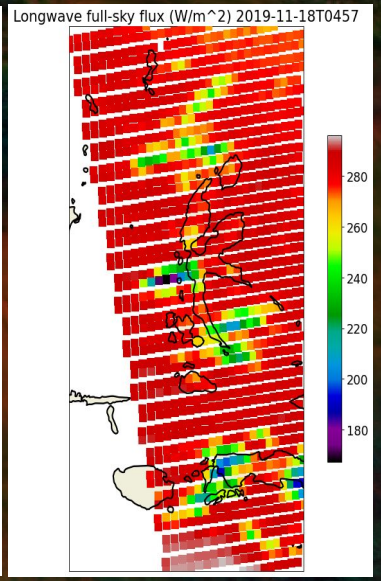
lat:[-5,5] lon:[120,130]

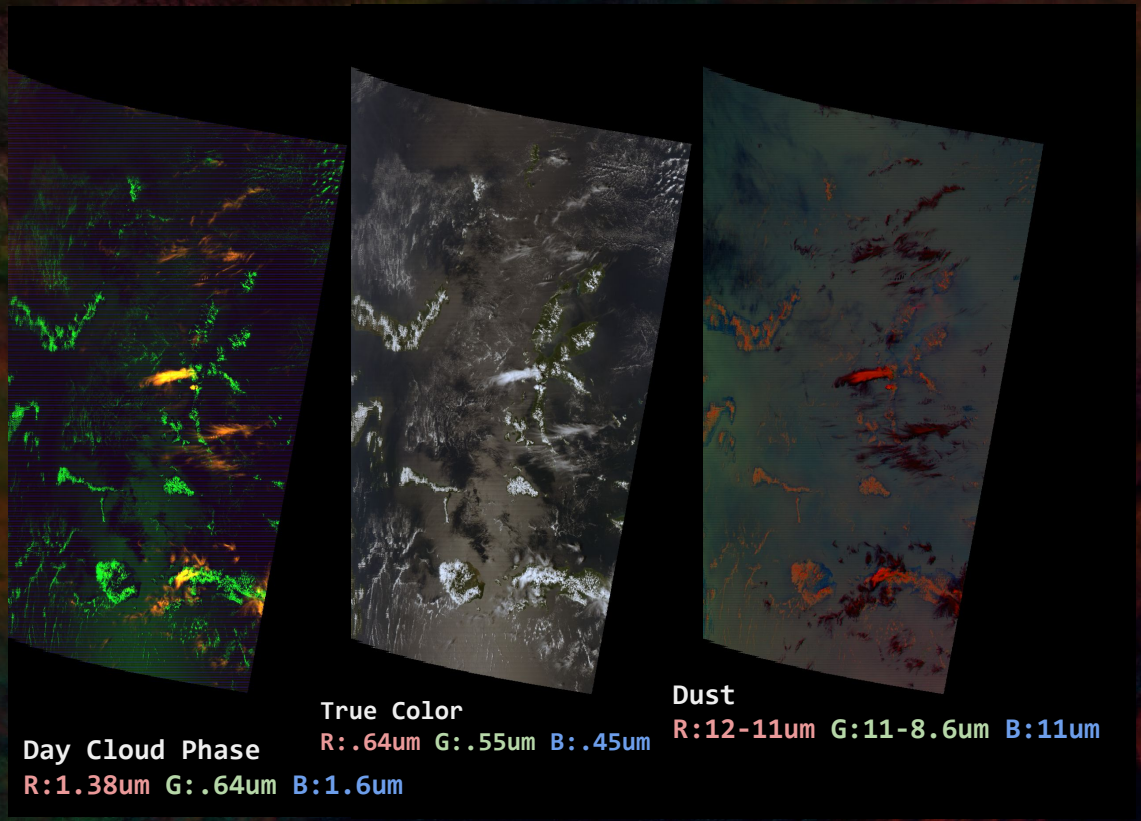
Tropical oceanic region with several islands spanning the equator.

Common surfaces:

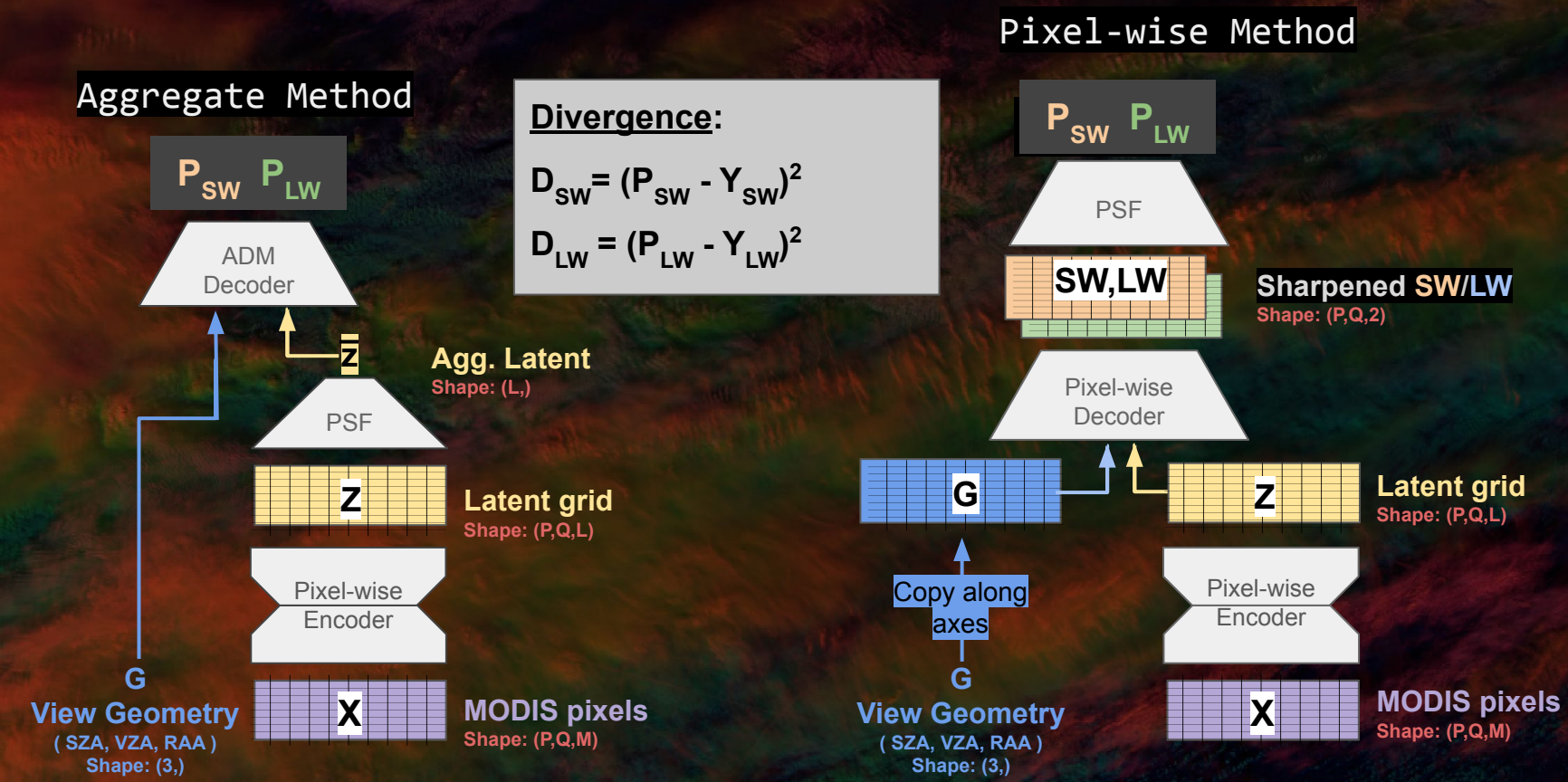
- Water
- Vegetation
- Sun glint
- Clouds of all varieties







Neural network architecture




Questions?