The Global Long-term Microwave Vegetation Optical Depth Climate Archive VODCA

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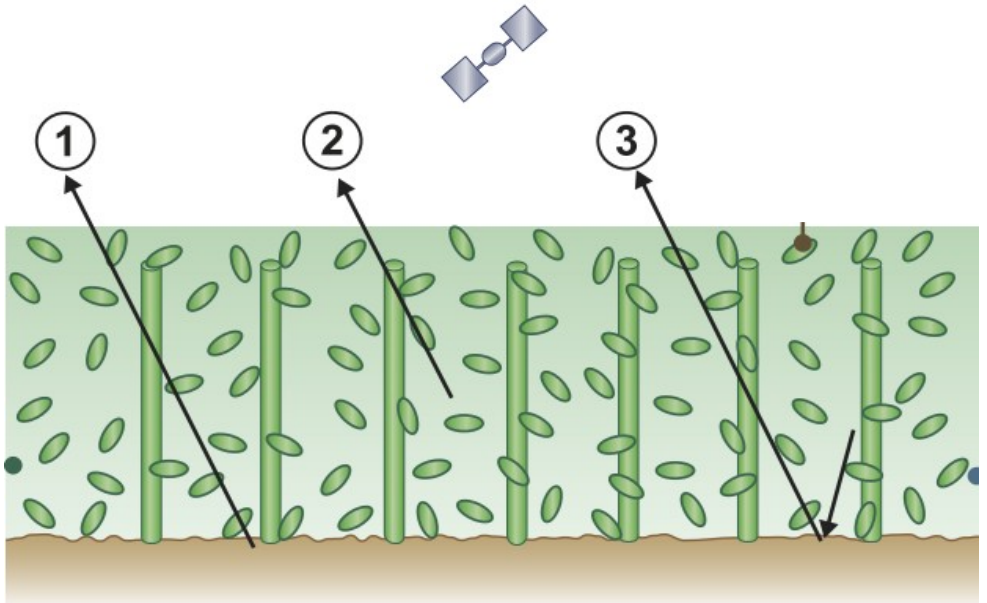
What is Vegetation Optical Depth?

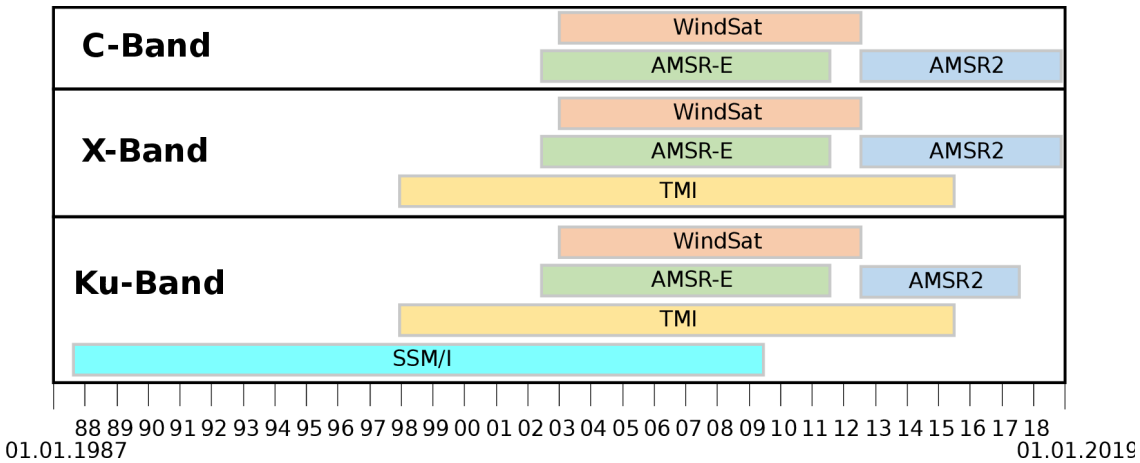
- VOD quantifies the attenuation of (microwave) radiation by vegetation.
  - Related to vegetation water content and biomass
  - Depending on wavelength



Konigs et al. 2019

Used VOD Data

- VOD can be derived from passive microwave emission measurements
  - Various space-borne C-, X- and Ku-band sensors exist since 1988
  - VOD retrieval algorithm: Land Parameter Retrieval Model (LPRM) [van der Schalie et al. 2018]
  - Spatial resolution: 0.25˚ x 0.25˚
  - Temporal resolution: daily



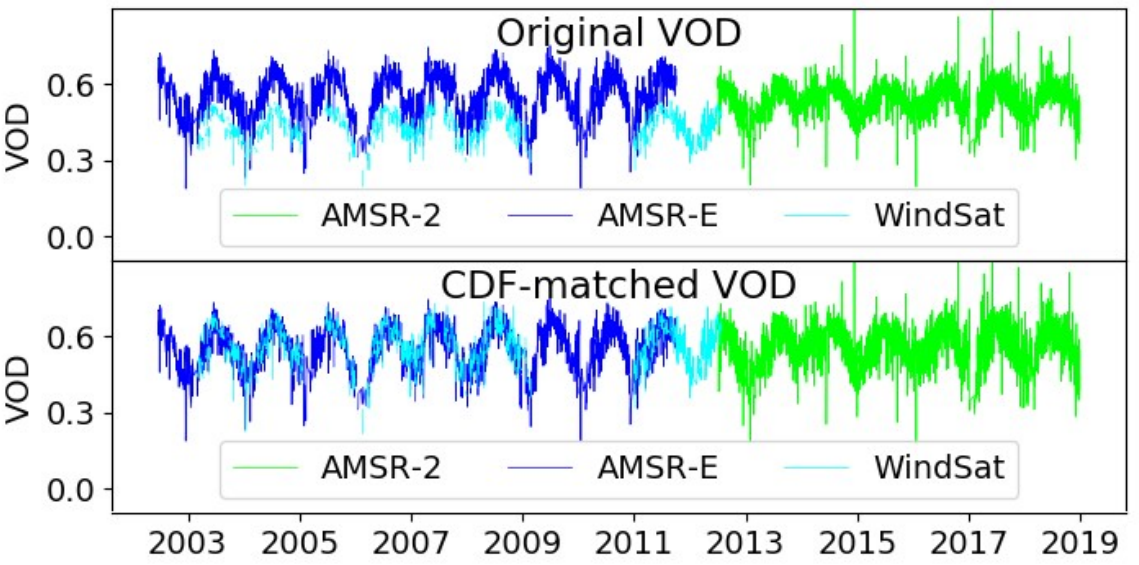
Problem definition & Methods

- Issue: Bias between sensors

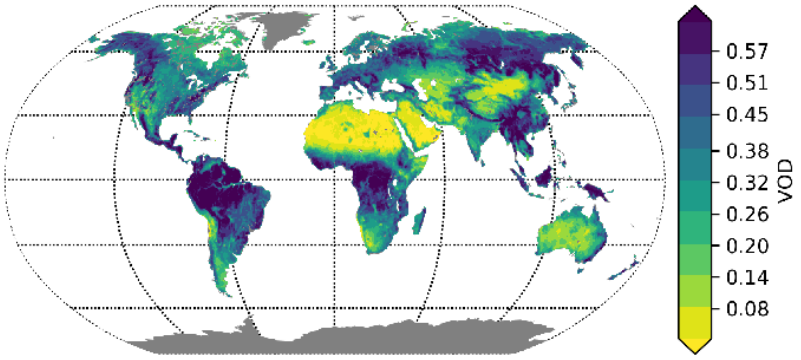
  → How to create long-term bias-free merged VOD product for each band? What are the properties of the created dataset?

- Solution:
  - CDF-Matching to AMSR-E for each grid point
  - Merge scaled observations by arithmetic mean

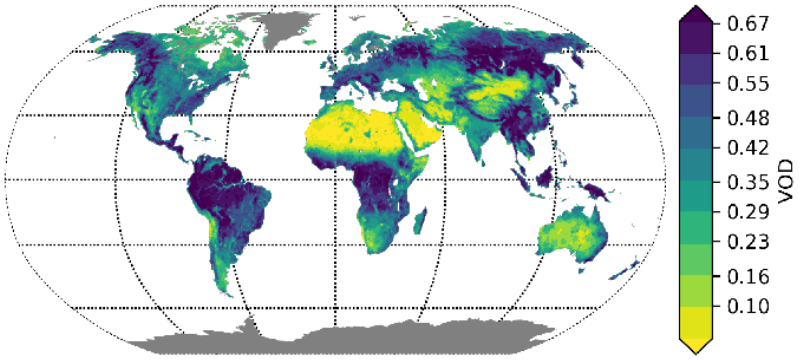
Example X-band time series



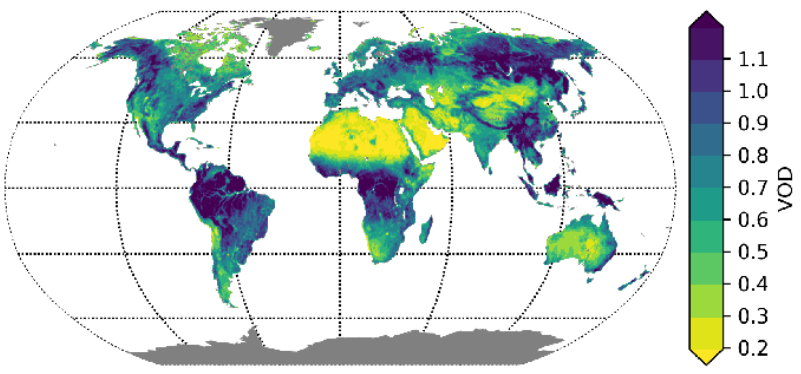
Mean VOD and LAI spatial distribution



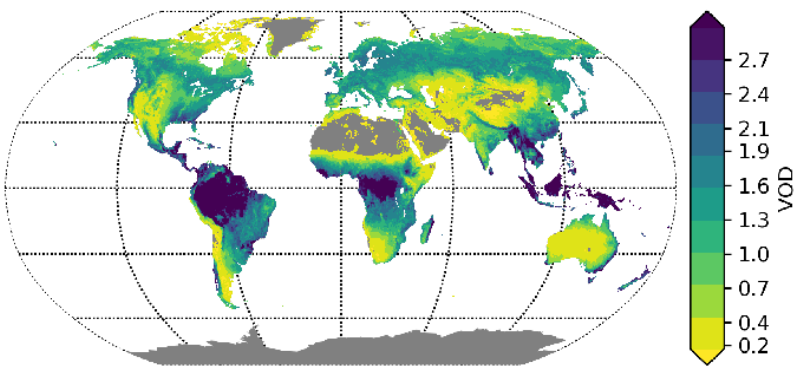
(a) C-band



(b) X-band

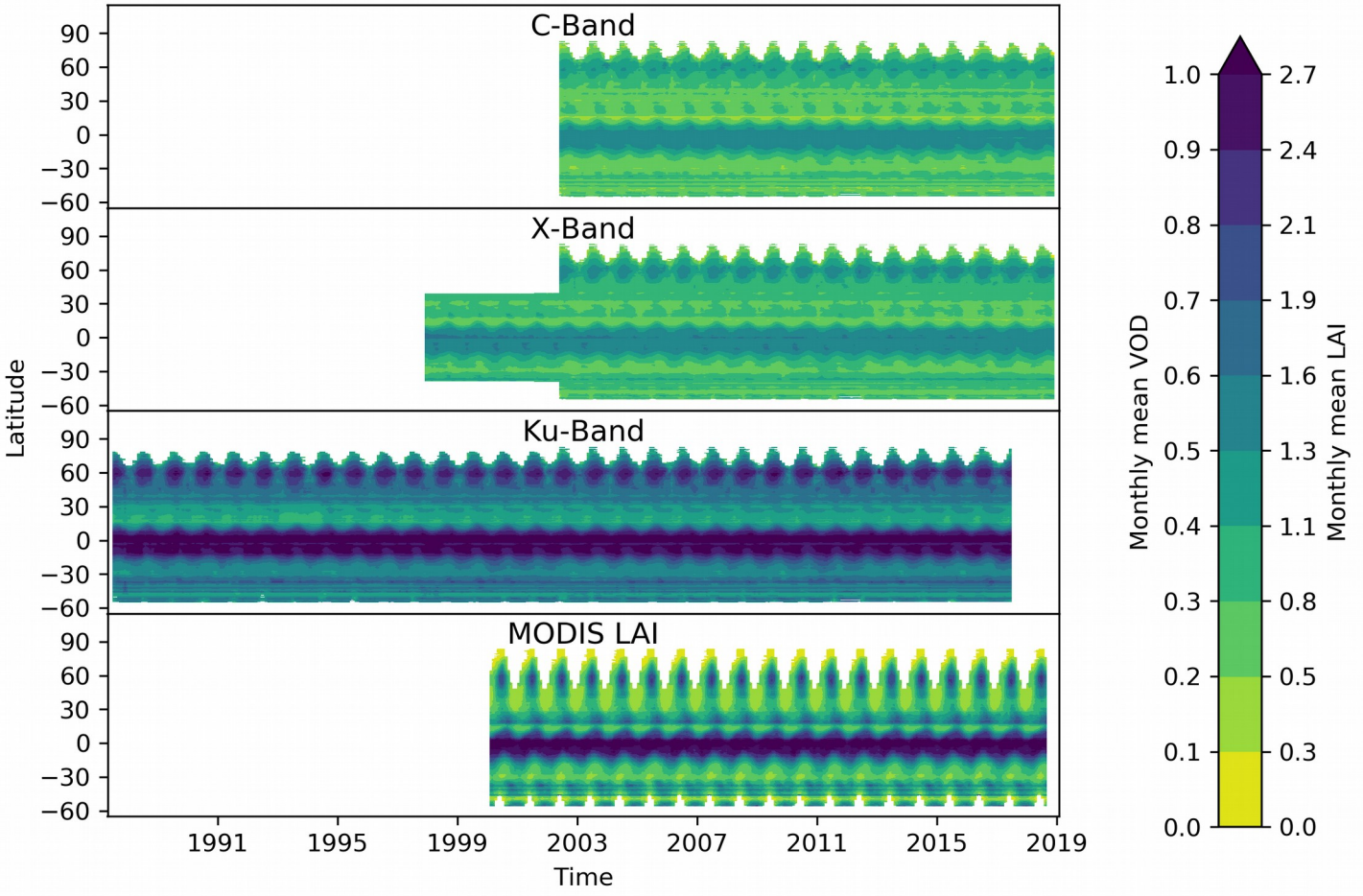


(c) Ku-band

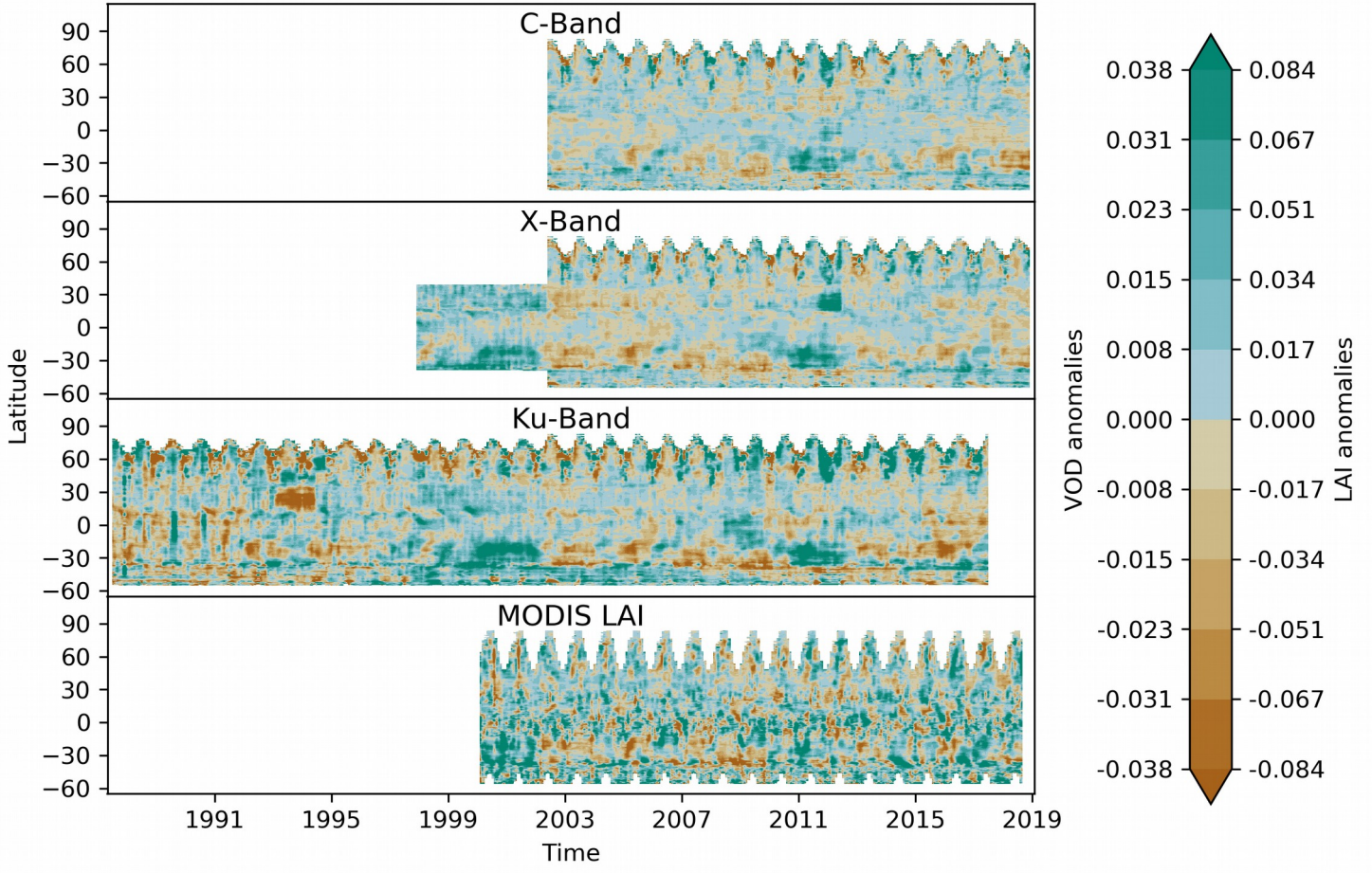


(d) MODIS LAI

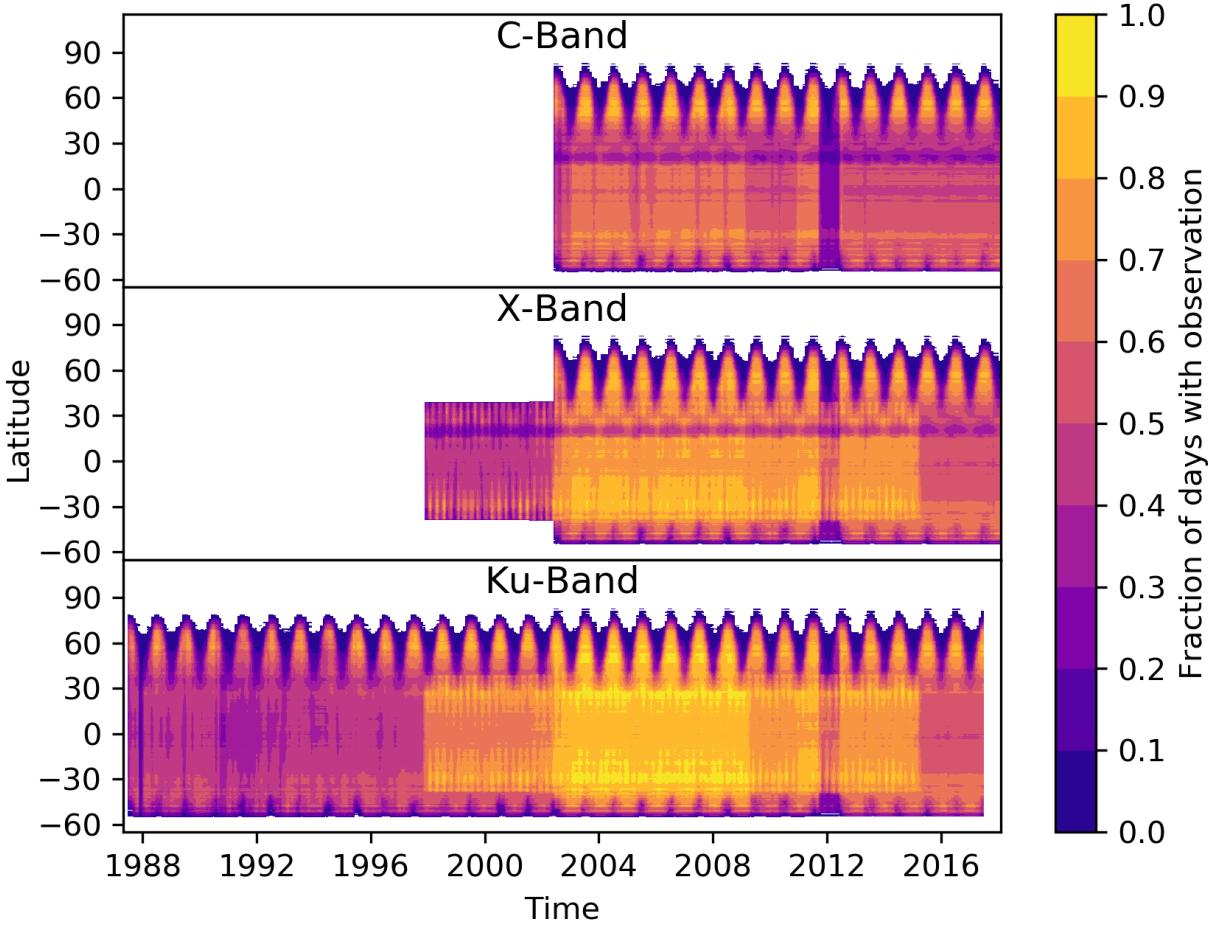
Monthly mean VOD and LAI per latitude and band



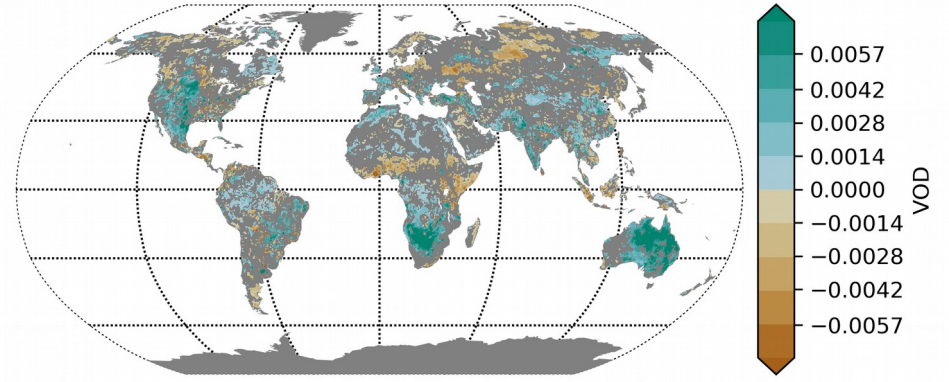
Monthly VOD and LAI anomalies per latitude



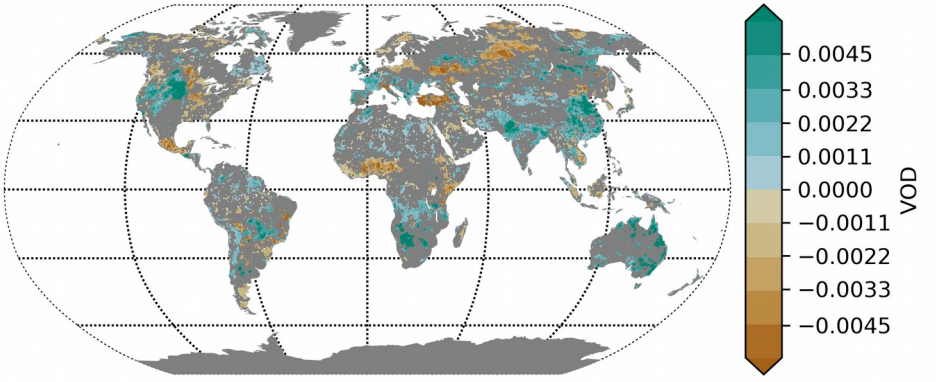
Temporal Coverage



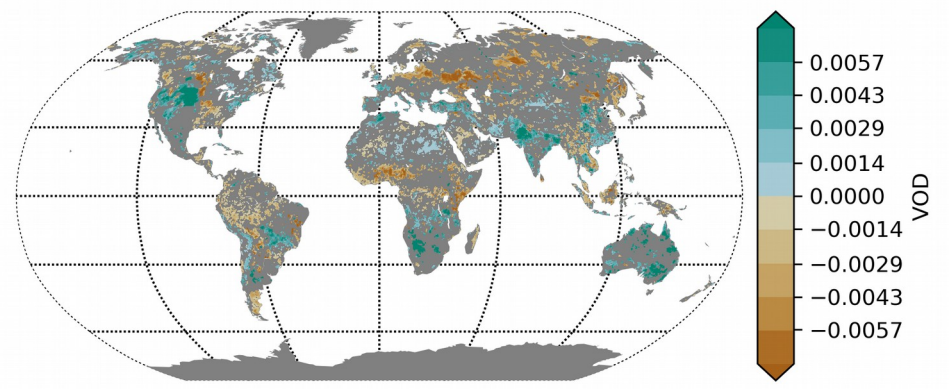
VOD trends from 2002-2017 for all bands



C-band

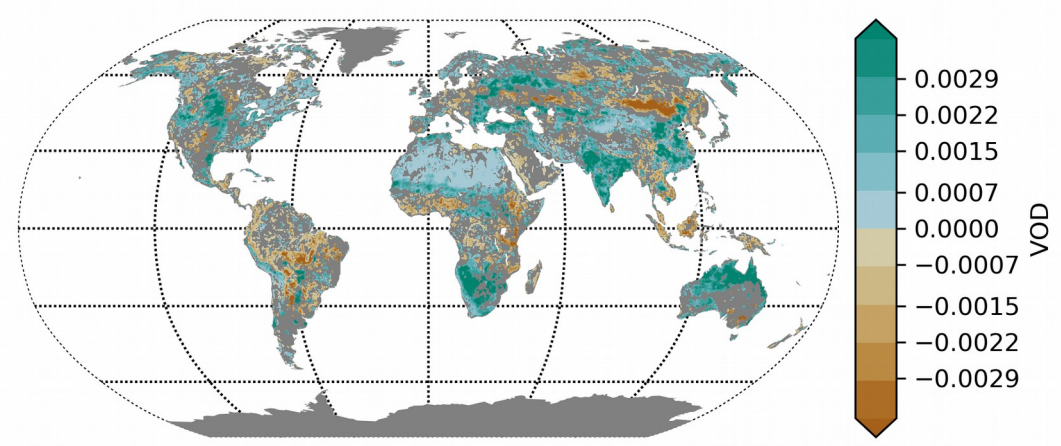


X-band

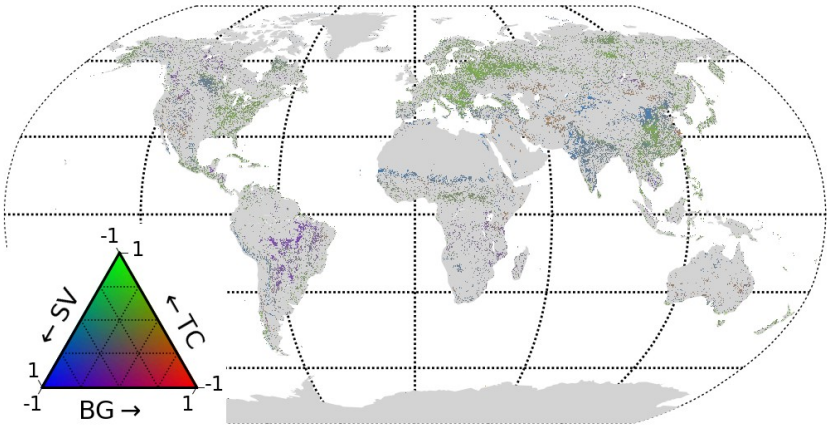


Ku-band

Long-term VODCA-Ku and land cover trends



VODCA-Ku trends 1987-2016



Land cover changes 1987-2016
Data: Song et al. 2018

Data Access

Get the Data!: https://zenodo.org/record/2575599

Related paper: https://www.earth-syst-sci-data.net/12/177/2020/essd-12-177-2020.html

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