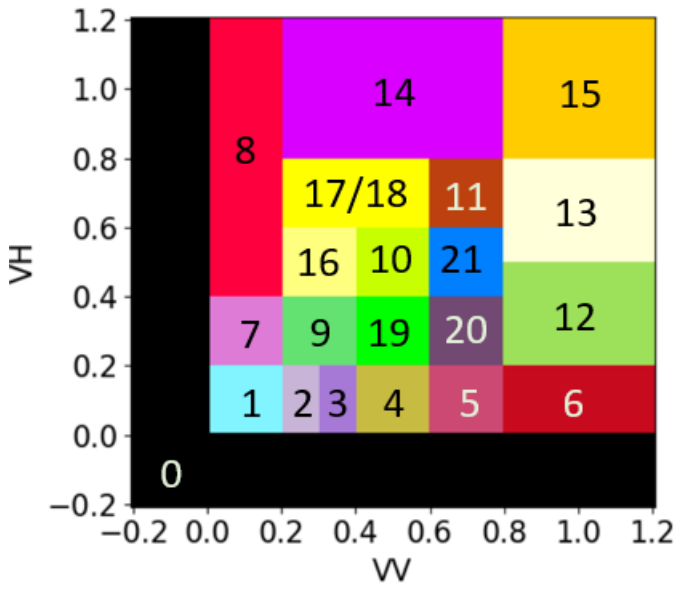
Introducing *dpolcat*, Dual-Polarimetric Radar Categorizer

Towards Semantic Enrichment of C-Band/Sentinel-1 Images

References
[1]: Planetary Computer Sentinel-1 RTC
[2]: SAR Handbook Ch. 3
[3]: Validation of SIAM
[4]: Planetary Computer homepage
[5]: Copernicus EMSR517

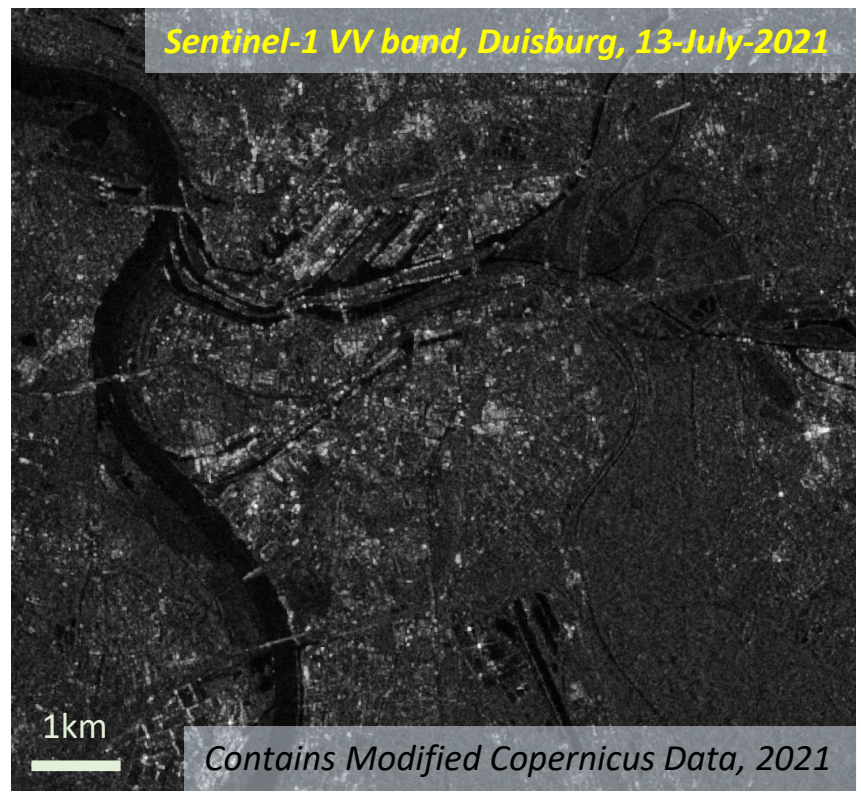


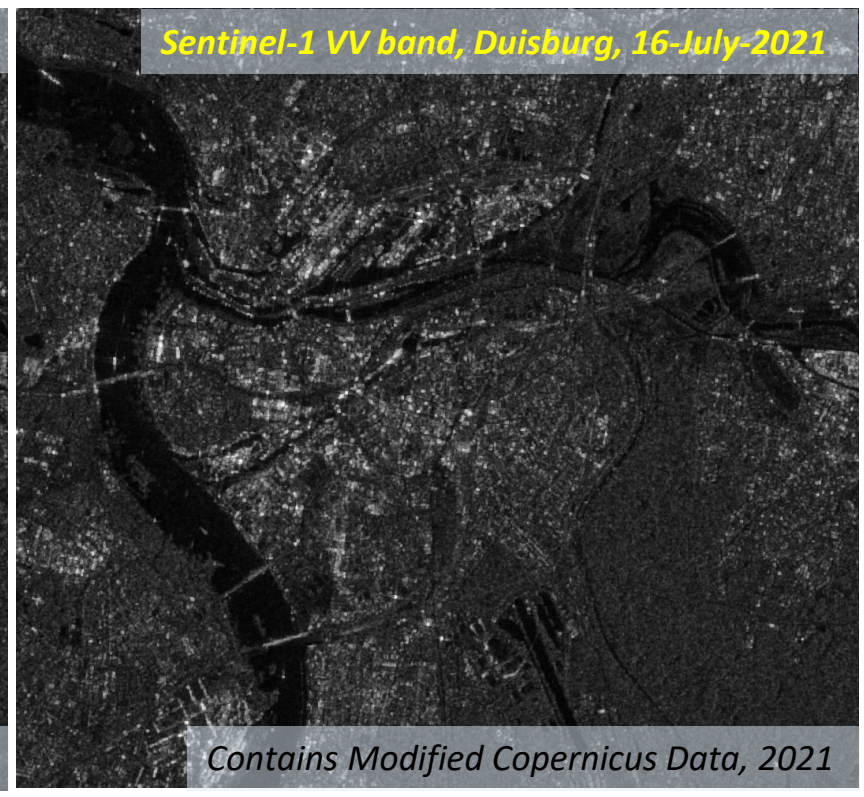
Essential info

- Categories based on Radiometrically Terrain Corrected (**RTC**) **VV** and **VH** backscatter [1].
- Encompasses **amplitude** and band **ratio** information.
- **Knowledge-based**: based on real-world scattering properties (see, e.g., [2]).
- **Decision-tree-based**. Understandable; fast (see, e.g., [3]).
- Developed within **Microsoft Planetary Computer** environment (Big Earth Data) [4].

Polarimetric categories

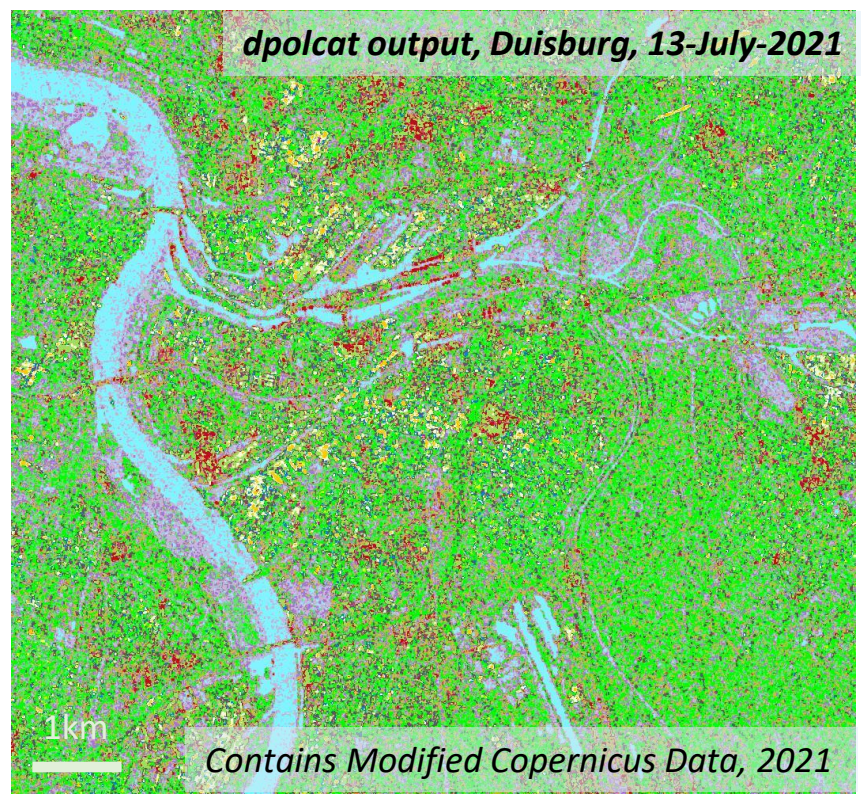
- Mostly surface scattering: 1,2,3,4
- Mostly volume scattering: 9,19,16,10
- Ill-defined (physically): 8
- NoData/invalid: 0
- Double-bounce/other: Remaining

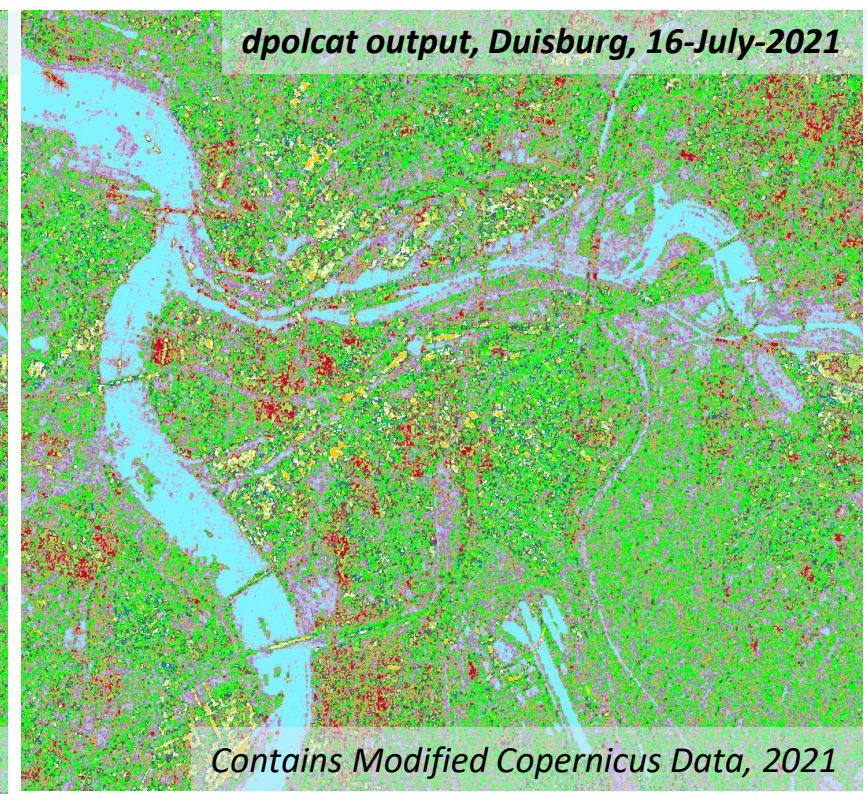




Example usage

Flood Mapping, Duisburg, July 2021





Other results

Preliminary results with burned-area delineation (somewhat successful), lava mapping (not very successful), and forest growth (inconclusive). Still early stages of development.

Further work

- Test with more study areas and applications
- **Refine categories**