EGU21-14349
https://doi.org/10.5194/egusphere-egu21-14349
EGU General Assembly 2021

Development of earth observation data cubes for monitoring land degradation processes in South Africa

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Global biodiversity and ecosystem services are under high pressure of human impact. Although avoiding, reducing and reversing the impacts of human activities on ecosystems should be an urgent priority, the loss of biodiversity continues. One of the main drivers of biodiversity loss is land use change and land degradation. In South Africa land degradation has a long history and is of great concern. The SPACES II project SALDi (South African Land Degradation Monitor) aims for developing new, adaptive and sustainable tools for assessing land degradation by addressing the dynamics and functioning of multi-use landscapes with respect to land use change and ecosystem services. SPACES II is a German-South African “Science Partnerships for the Adaptation to Complex Earth System Processes”. Within SALDi ready-to-use earth observation (EO) data cubes are developed. EO data cubes are useful and effective tools using earth observations to deliver decision-ready products. By accessing, storing and processing of remote sensing products and time-series in data cubes, the efficient monitoring of land degradation can therefore be enabled. The SALDi data cubes from optical and radar satellite data include all necessary pre-processing steps and are generated to monitor vegetation dynamics of five years for six focus areas. Intra- and interannual variability in both, a high spatial and temporal resolution will be accounted to monitor land degradation. Therefore, spatial high resolution earth observation data from 2016 to 2021 from Sentinel-1 (C-Band radar) and Sentinel-2 (multispectral) will be integrated in the SALDi data cube for six research areas of 100 x 100 km. Additionally, a number of vegetation indices will be implemented to account for explicit land degradation and vegetation monitoring. Spatially explicit query tools will enable users of the system to focus on specific areas, like hydrological catchments or blocks of fields.