

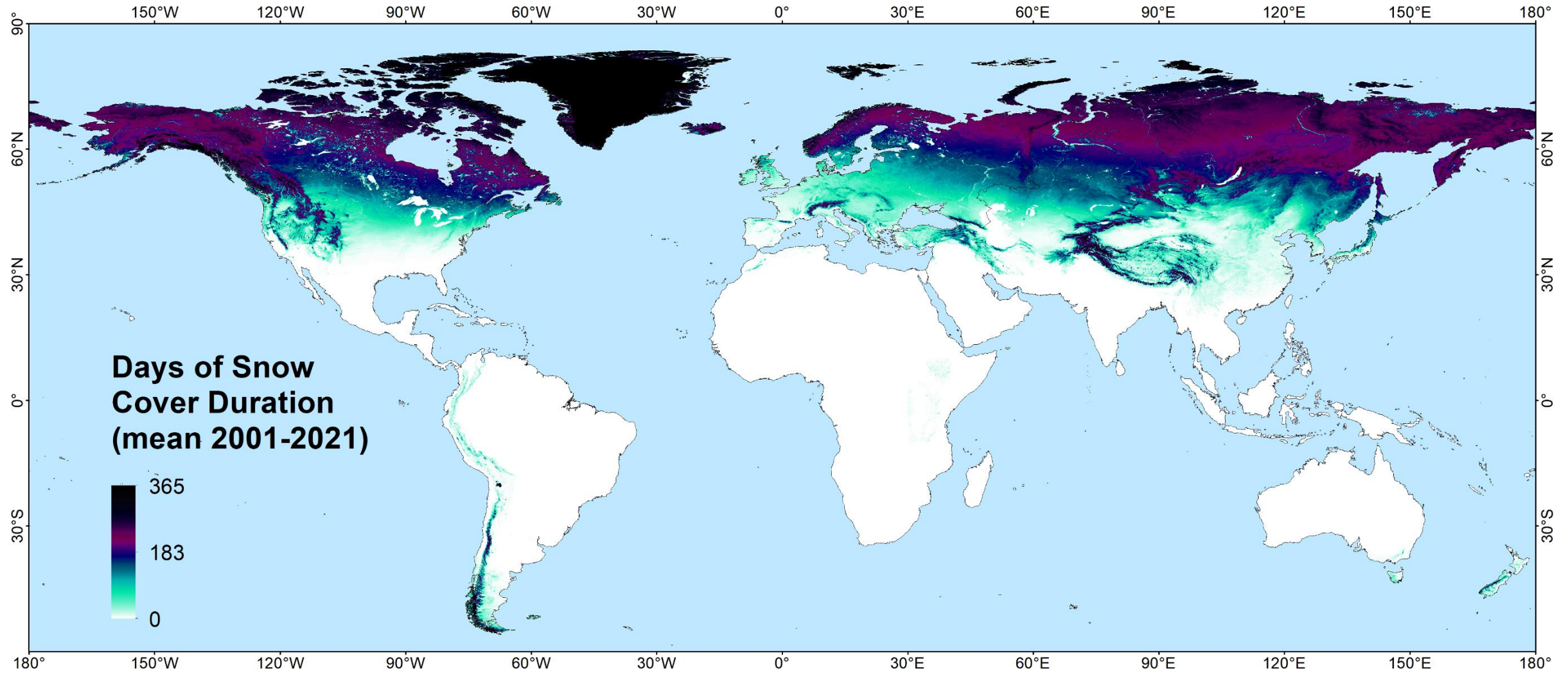
Use of near real-time cloud-free MODIS snow cover data from DLR's Global SnowPack for the early forecast of extreme hydrological events

Sebastian Rößler & Andreas Dietz

*German Aerospace Center (DLR)
Earth Observation Center (EOC)
Department Land Surface Dynamics*

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Global SnowPack – interpolated MODIS snow coverage

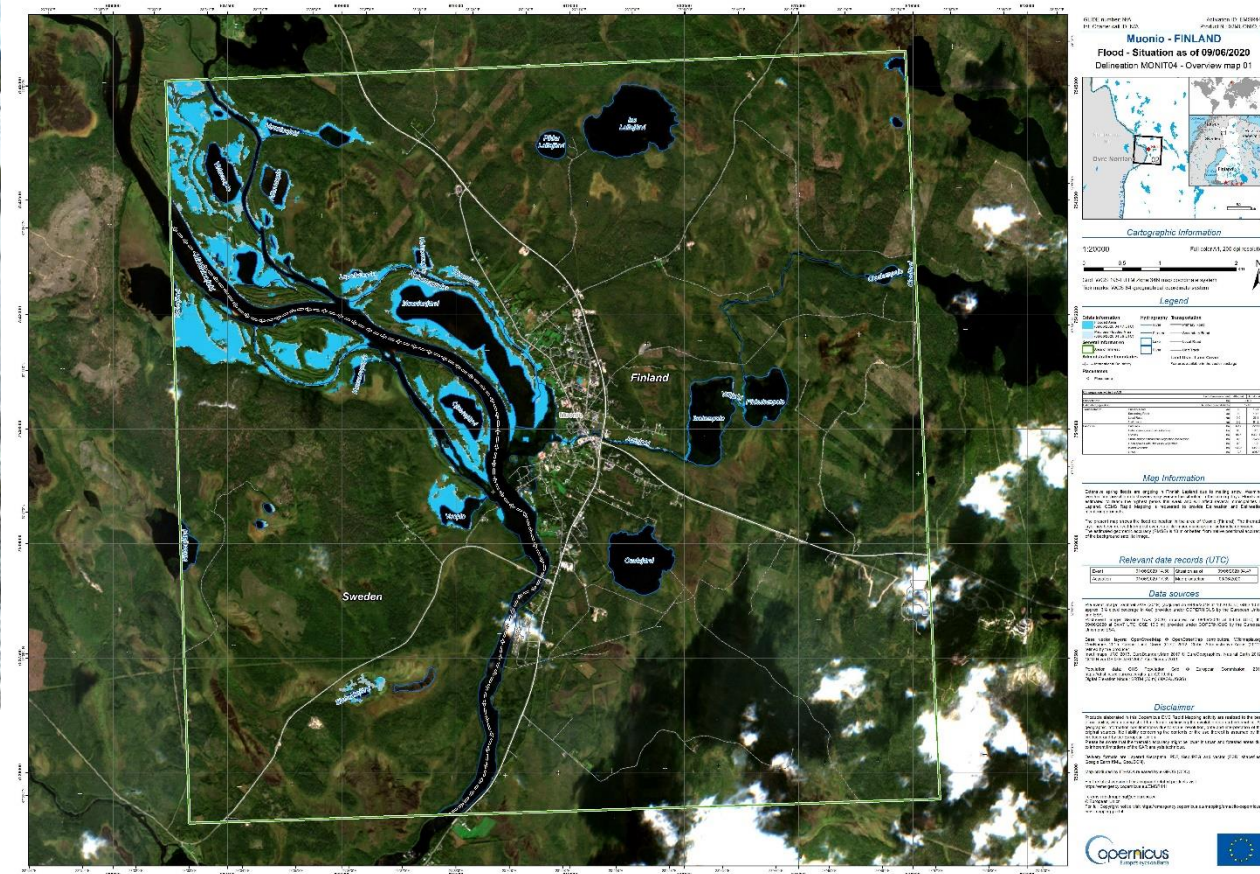


Motivation: Flood in Lapland 2020



<https://www.ely-keskus.fi/-/floods-in-lapland-are-over-and-water-levels-are-falling-lapland->

Can our operational remote sensing product recognize events like this?



<https://emergency.copernicus.eu/mapping/list-of-components/EMSR441>



Analysis: Flood in Lapland 2020




geosciences

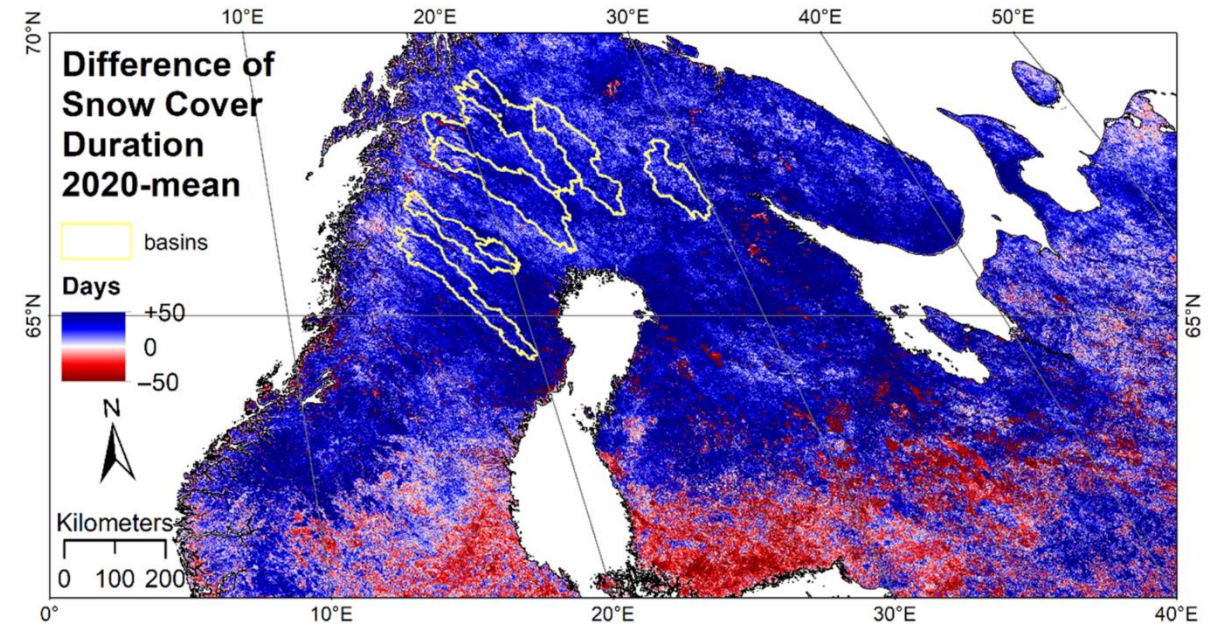
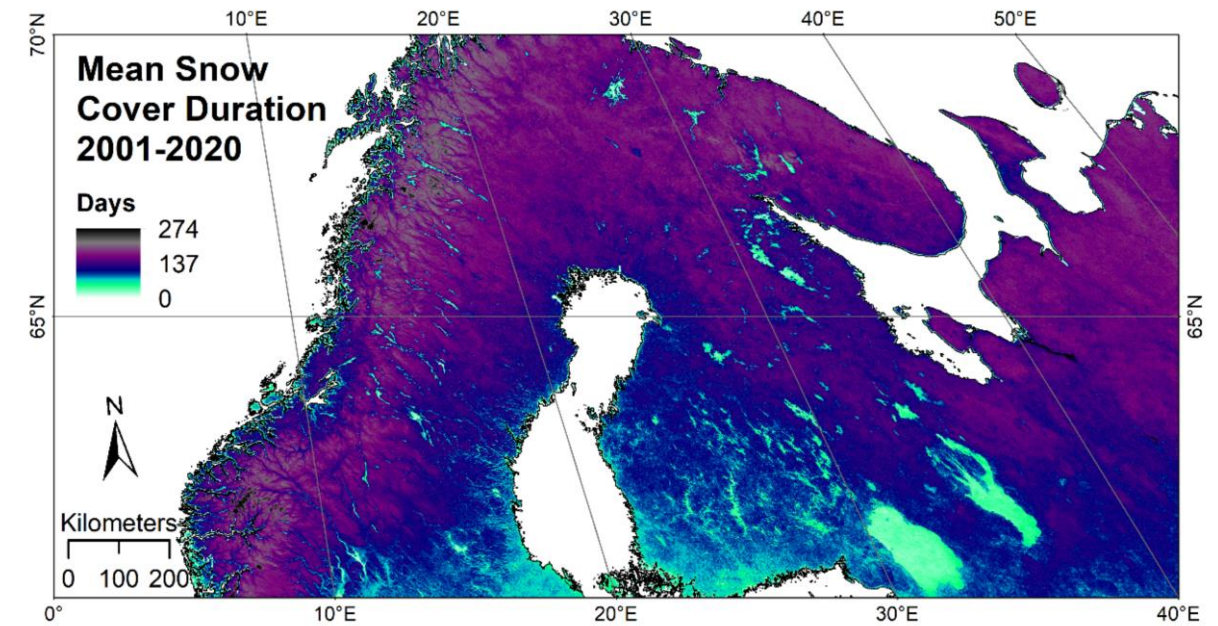
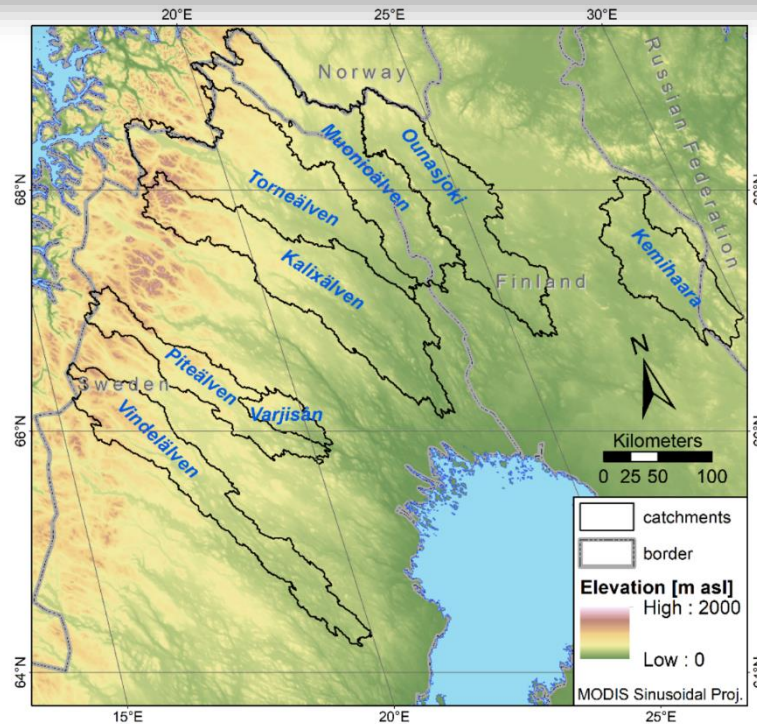
DOI: 10.3390/geosciences11030130



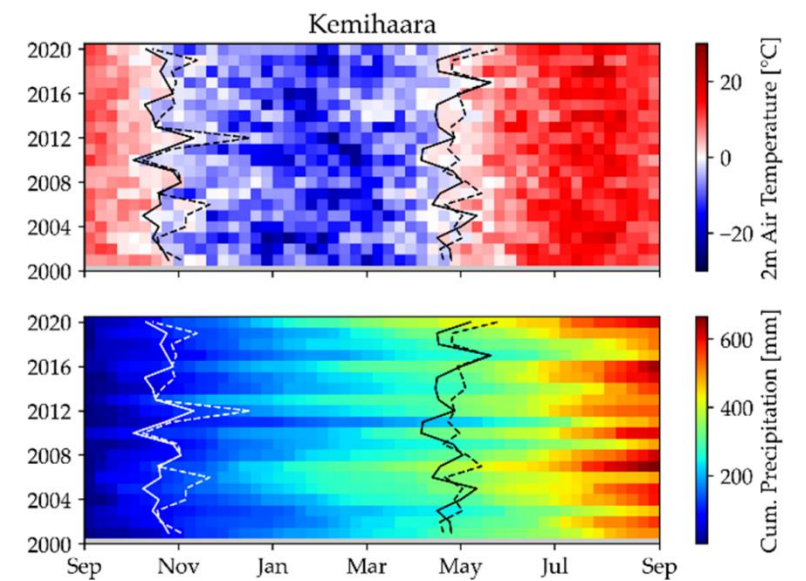
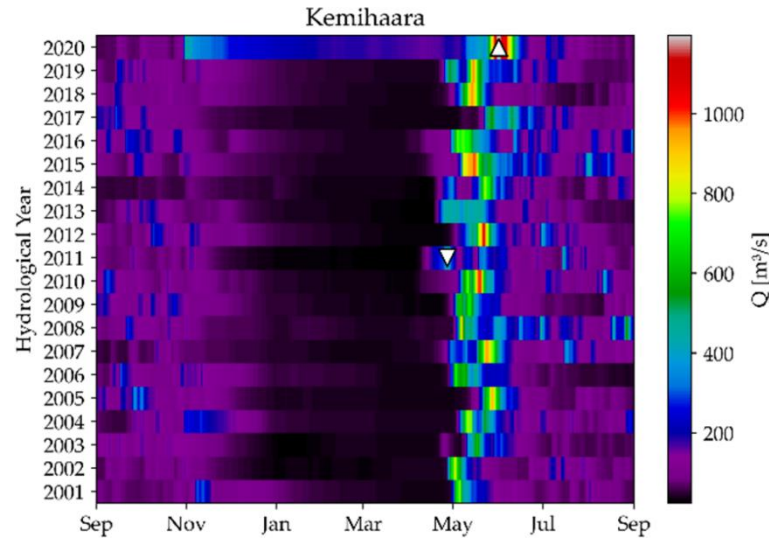
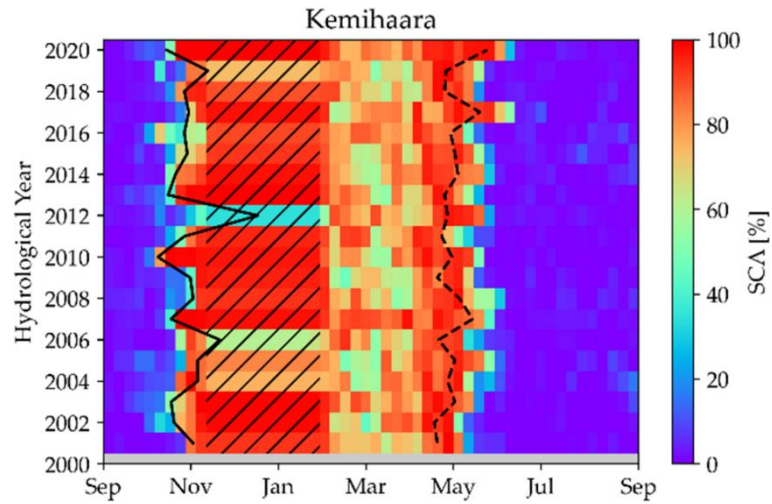
Article

Remote Sensing of Snow Cover Variability and Its Influence on the Runoff of Sápmi's Rivers

Sebastian Röbner ^{1,*}, Marius S. Witt ², Jaakko Ikonen ³, Ian A. Brown ⁴  and Andreas J. Dietz ¹

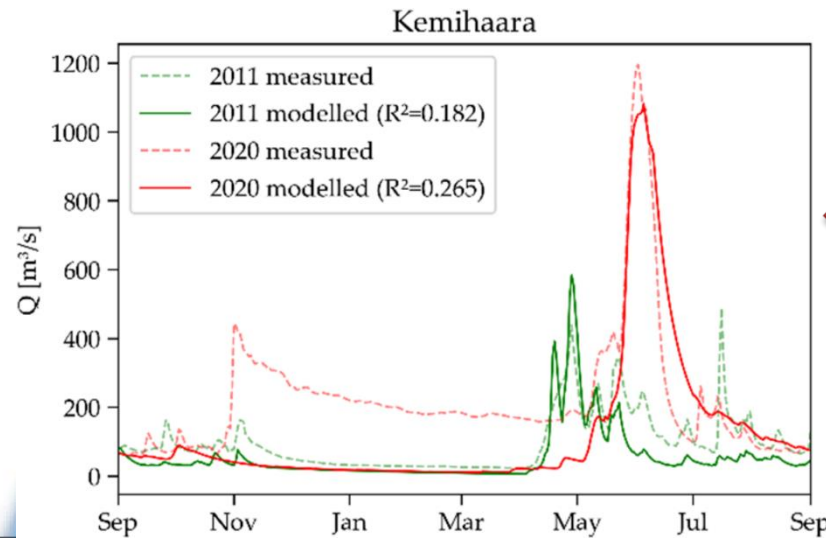


SRM Results



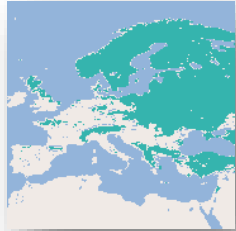
SRM-Parameterization with

- snow cover
- digital elevation model
- meteorological measurements

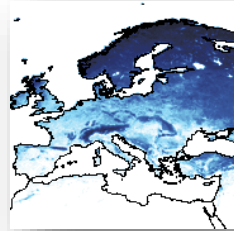


Result of the minimal spring flood 2011 and the maximum spring flood 2020 to the modeled discharge with SRM

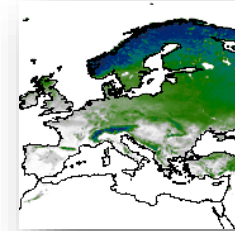
Global SnowPack – Product Suite



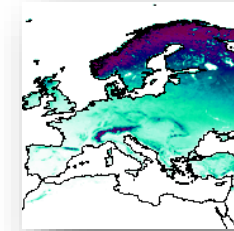
Daily Snow Cover Extent (SCE) in Near Realtime



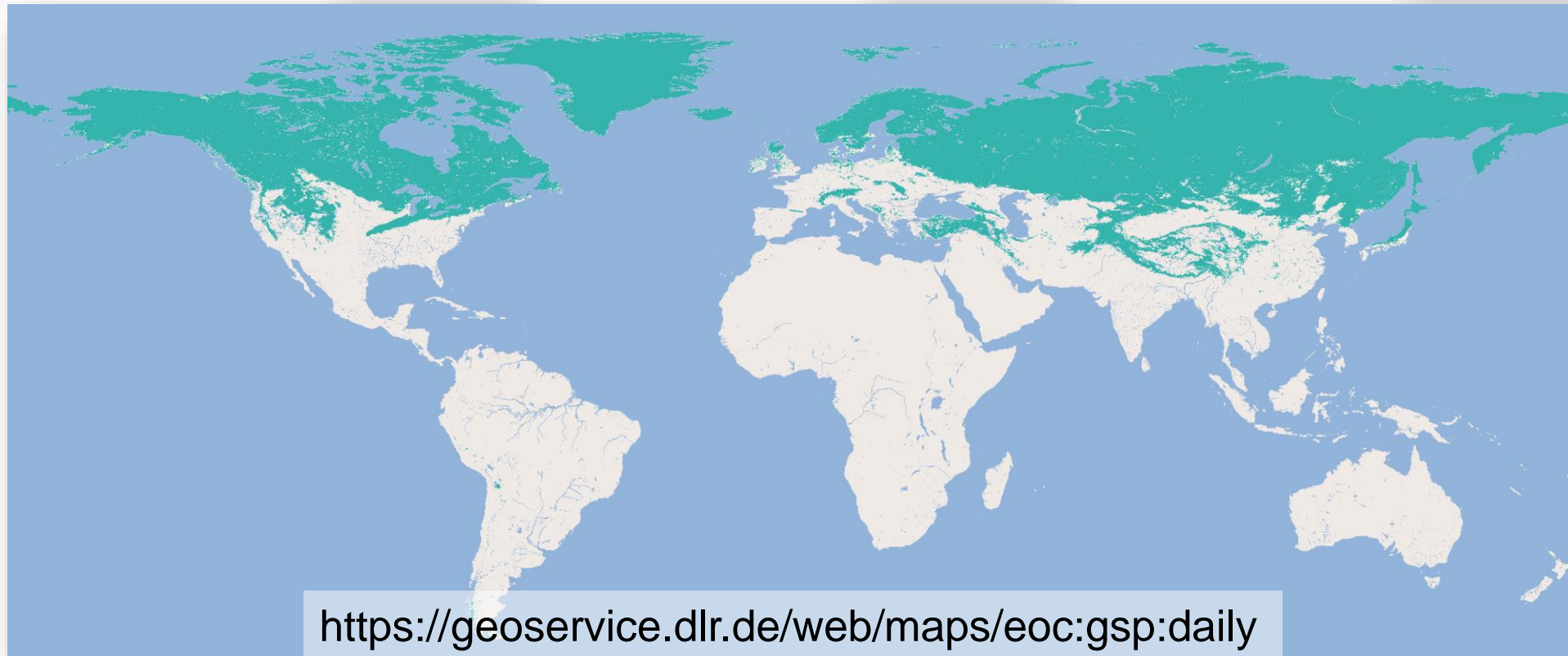
Snow Cover Duration Early Season (SCDE)



Snow Cover Duration Late Season (SCDL)



Snow Cover Duration (SCD)



<https://geoservice.dlr.de/web/maps/eoc:gsp:daily>

Observation of selected catchment areas with GSP-NRT

Amur



Aral Sea



California



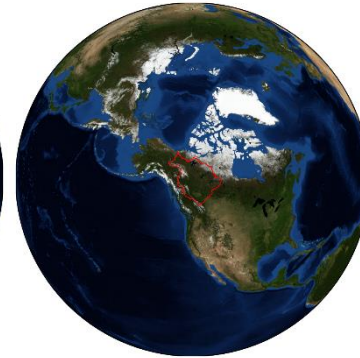
Danube



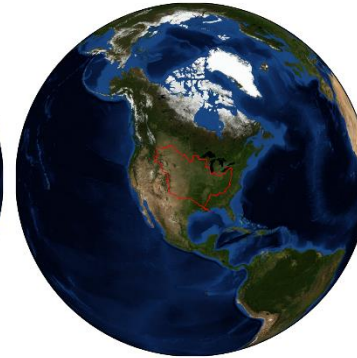
Lena



Mackenzie



Mississippi



Nelson



Ob



Rhine



Saint Lawrence



Volga



Yenisey



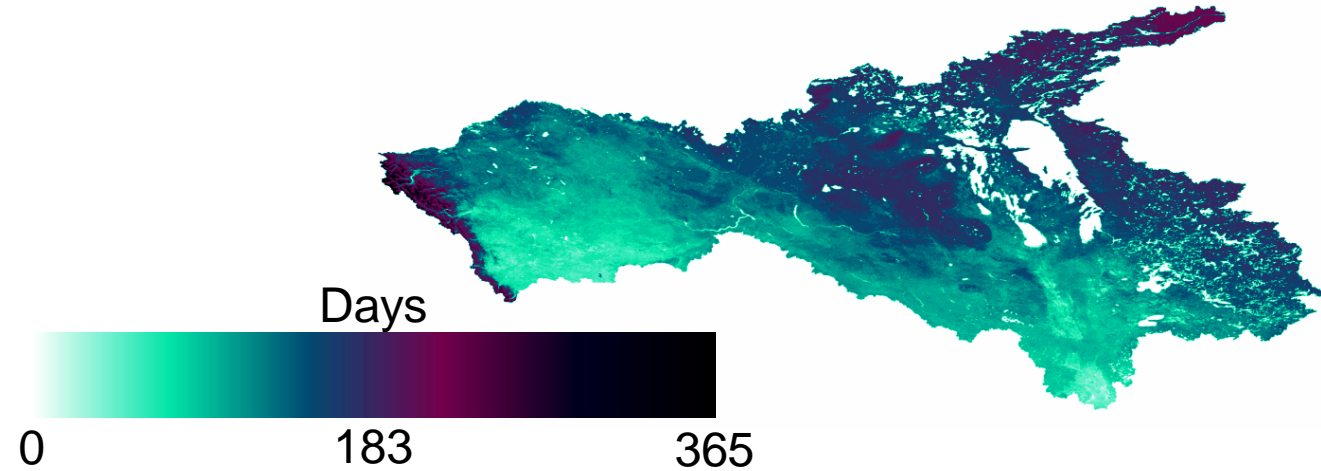
Yukon



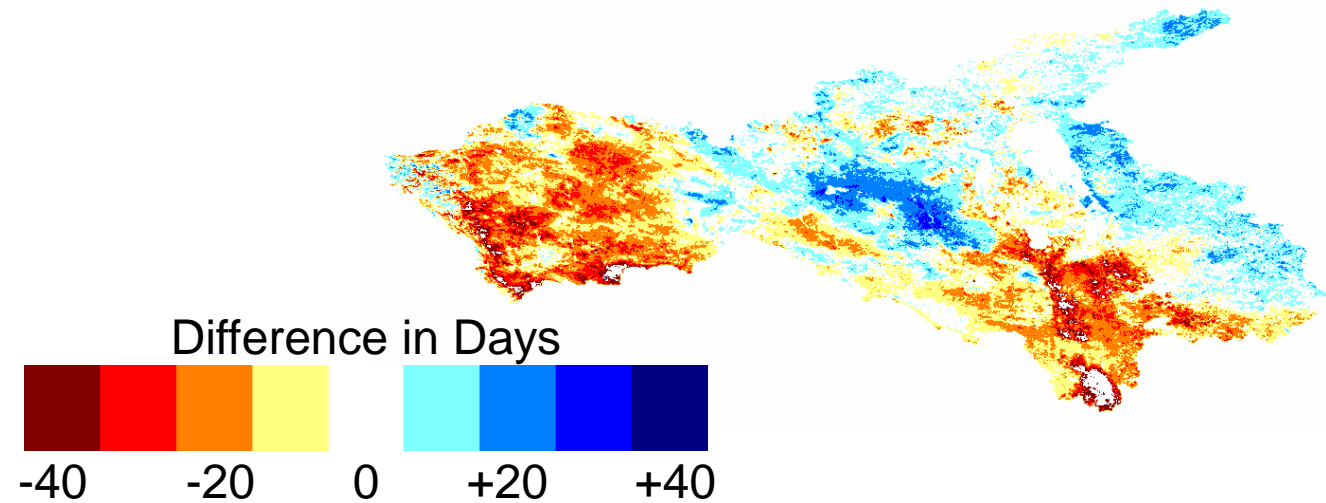
Example of catchment based Analysis – Nelson River



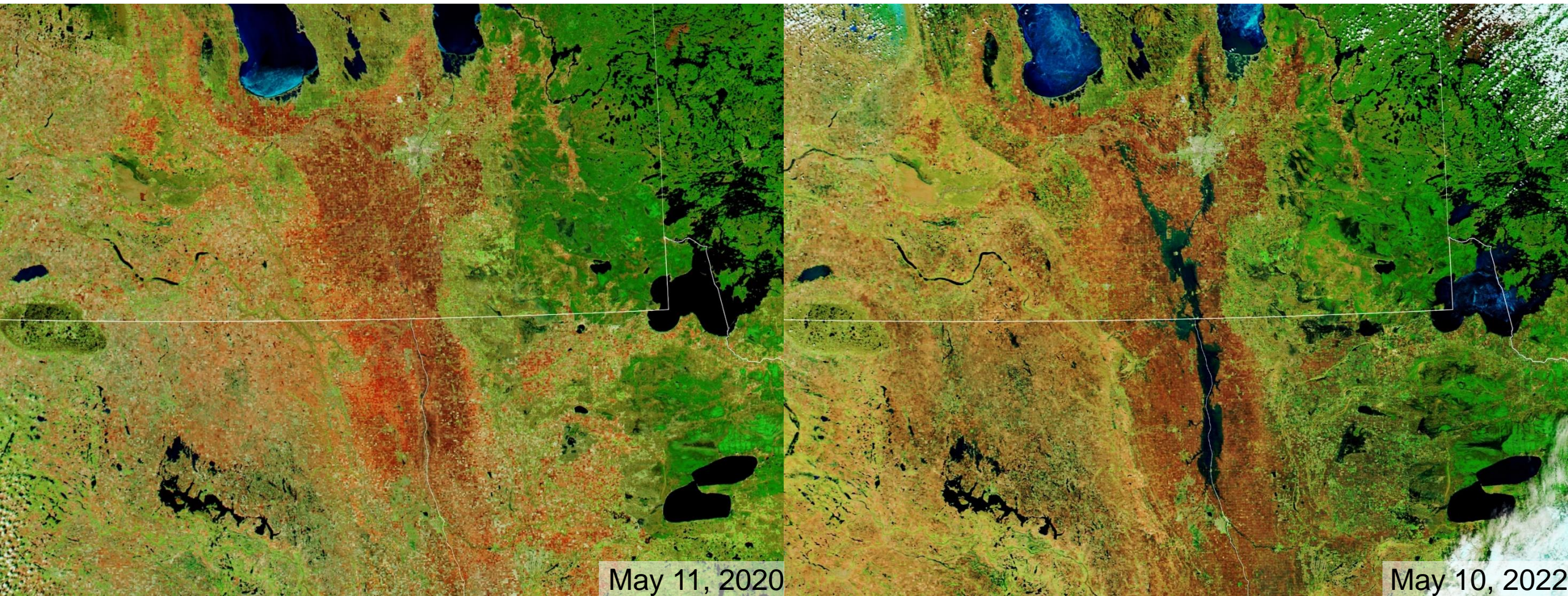
nelson SCD full 2003



nelson diff SCD full (2003 - mean)

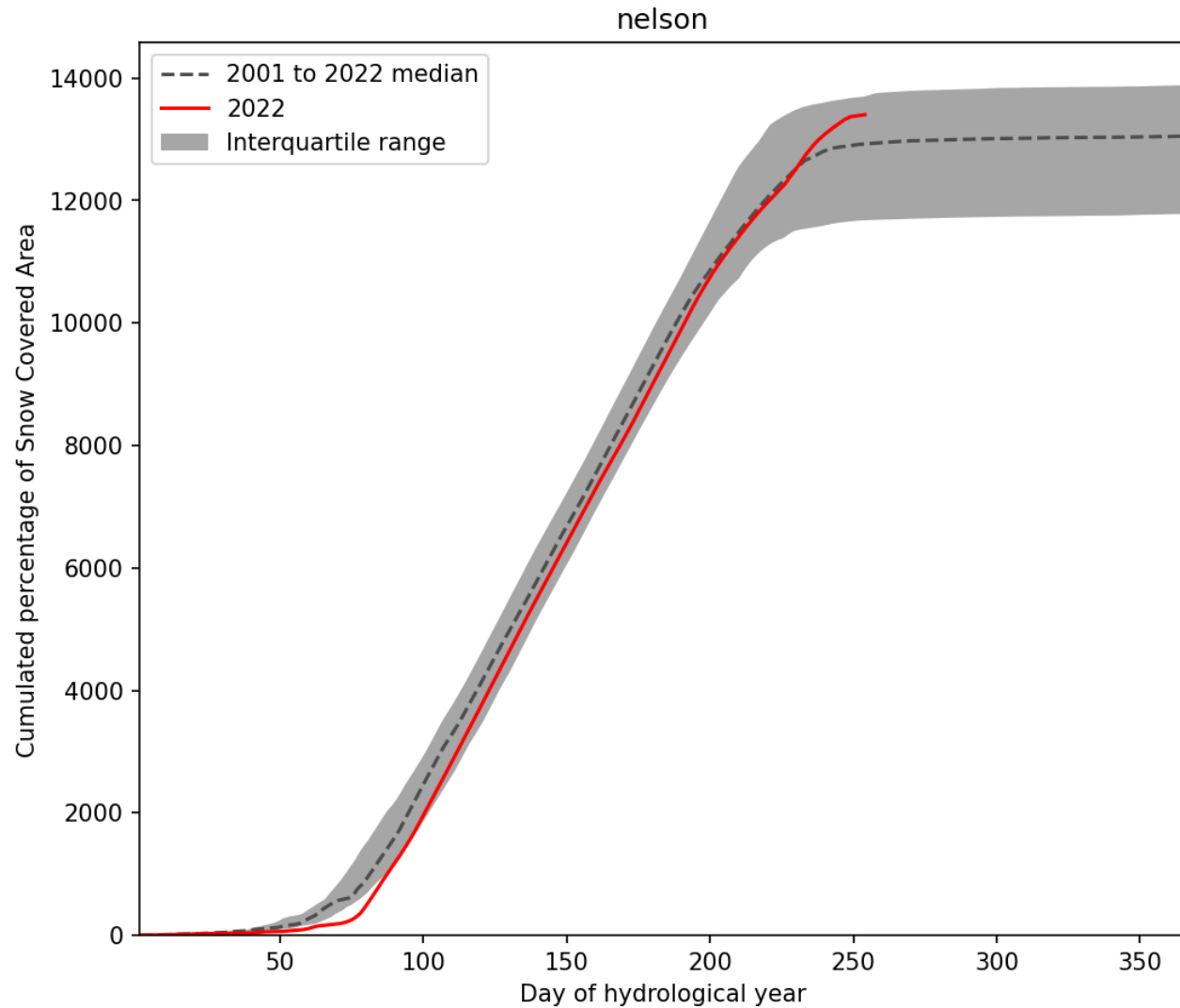
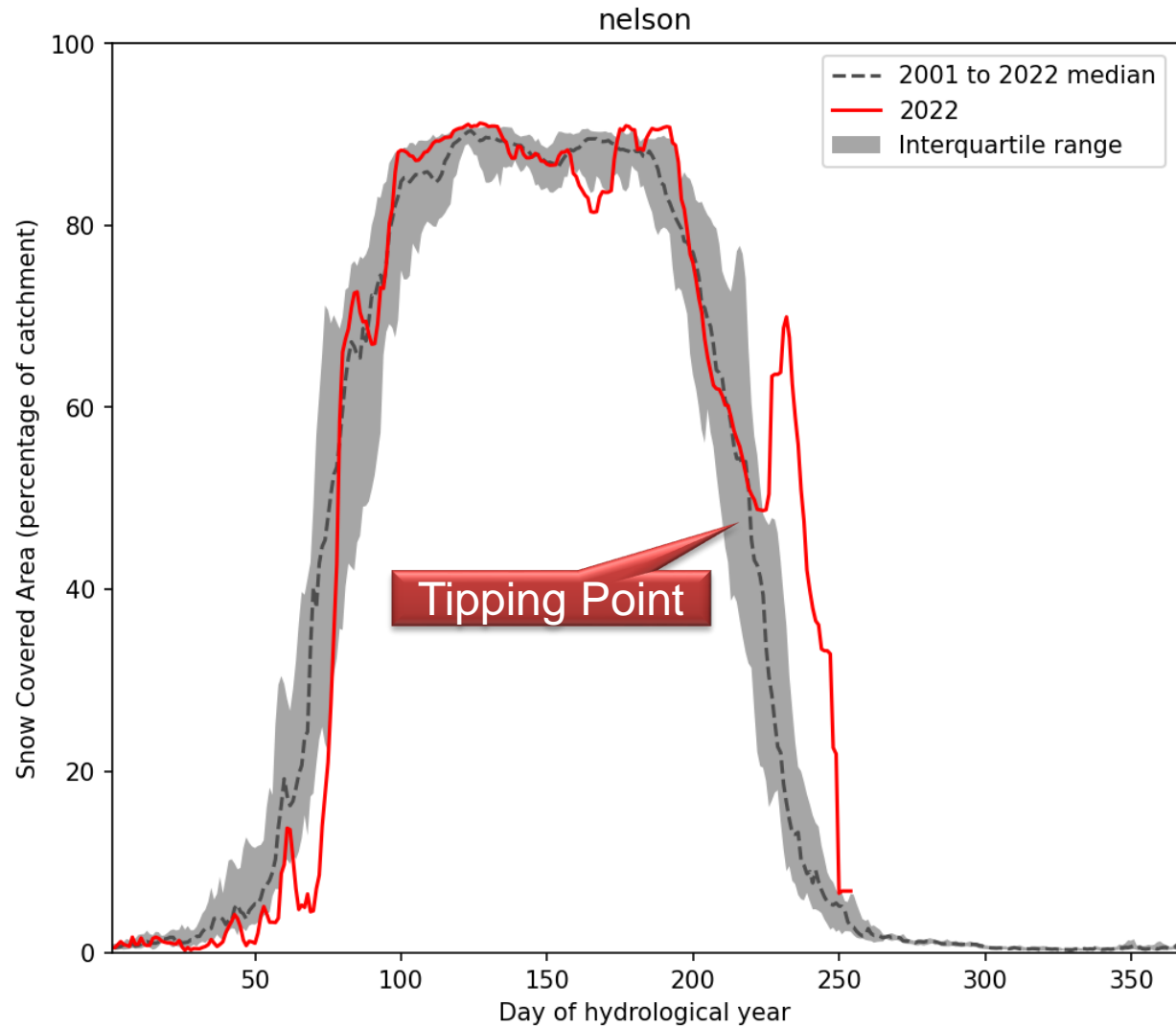


„Red River Flooding is Worst in a Decade”



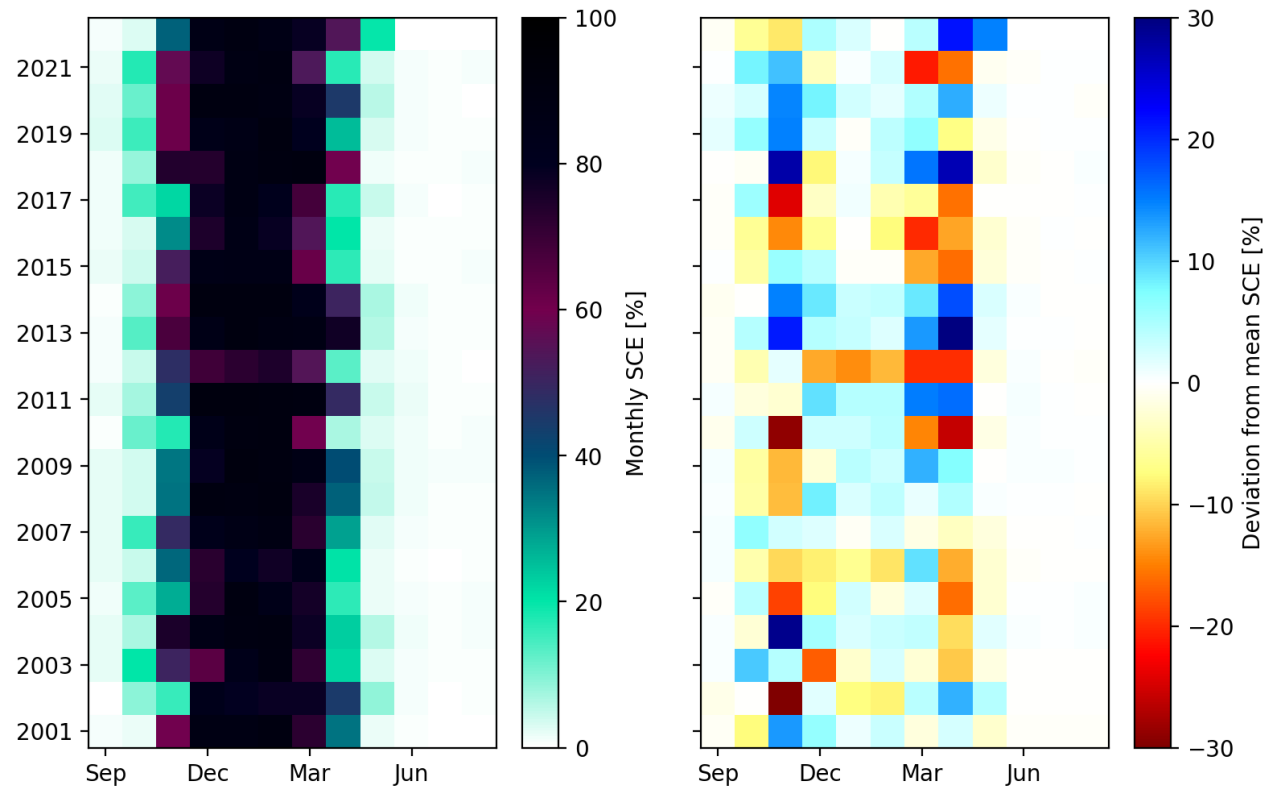
<https://earthobservatory.nasa.gov/images/149822/red-river-flooding-is-worst-in-a-decade>

Observed development with GSP-NRT

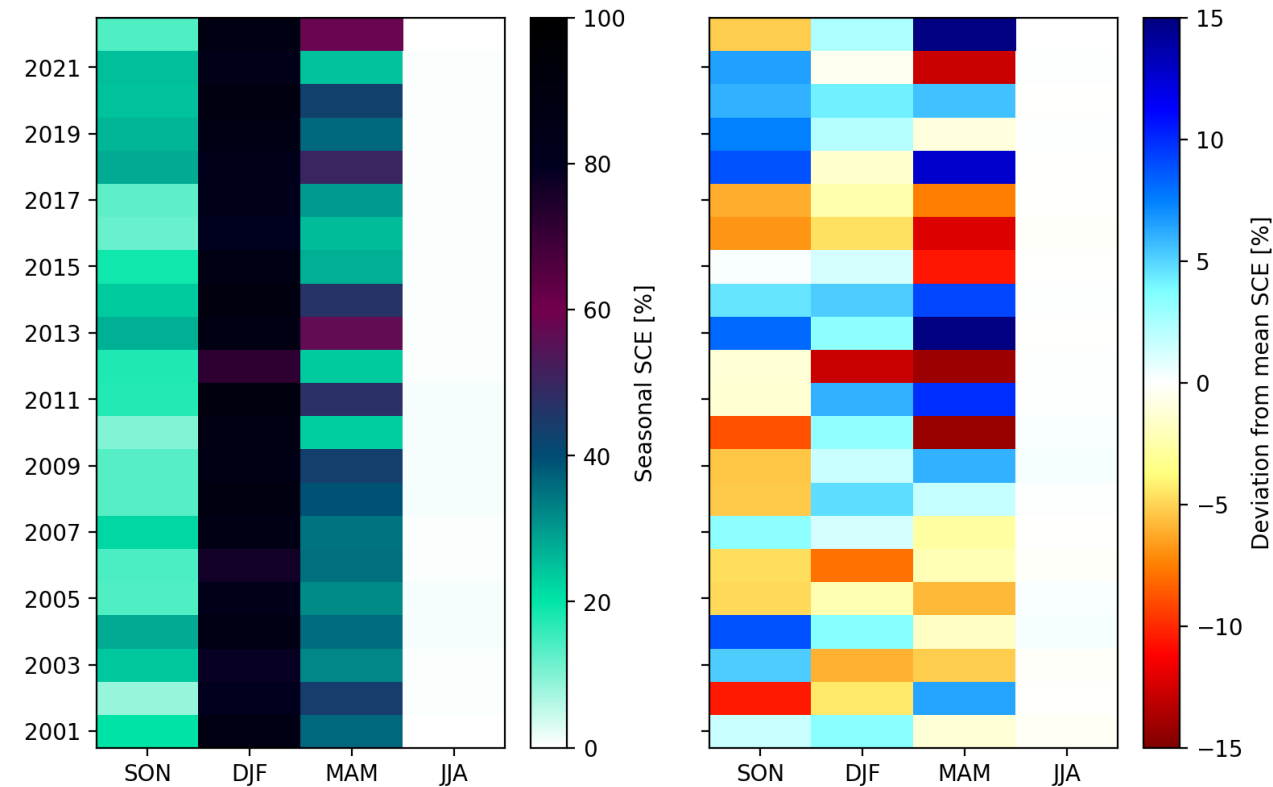


Observed development with GSP-NRT

nelson SCE monthly 2001 - 2022



nelson SCE seasonal 2001 - 2022



Our Mission: Find tipping points in the development of Snow Cover Extent indicating coming hydrological extremes!



Thank you for your attention

I am happy to answer your questions 😊

