The Arctic portal – a comprehensive geo-informational system to study the Arctic with satellite data.

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The Arctic Portal

Web GIS Application

- Satellite data on map
- Arctic region
- Data from NASA, ESA, JAXA ...

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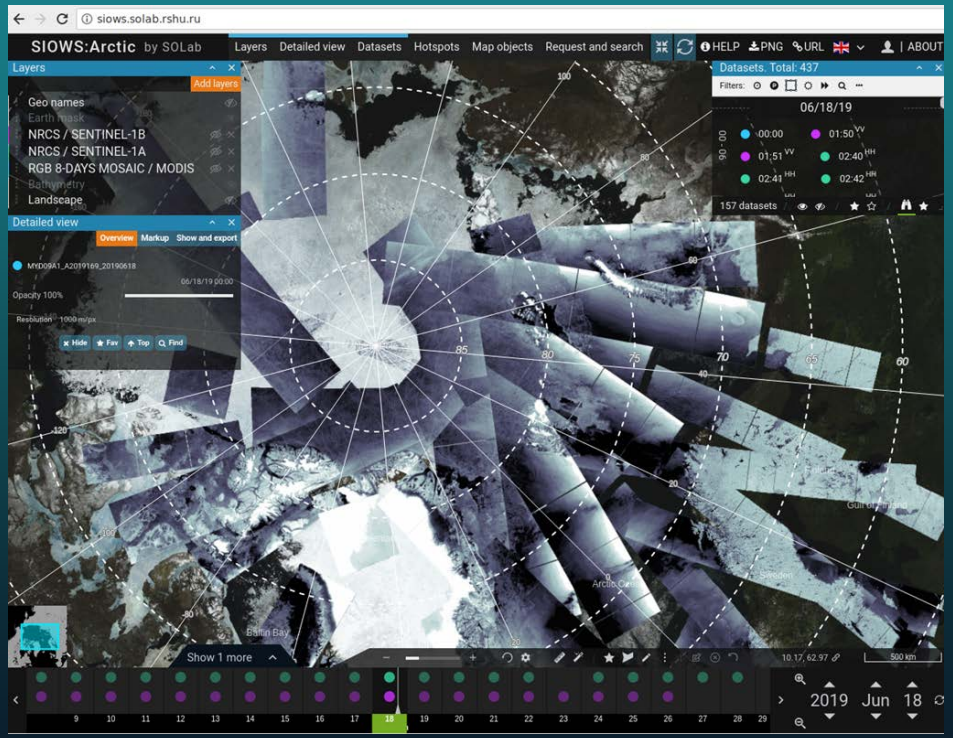


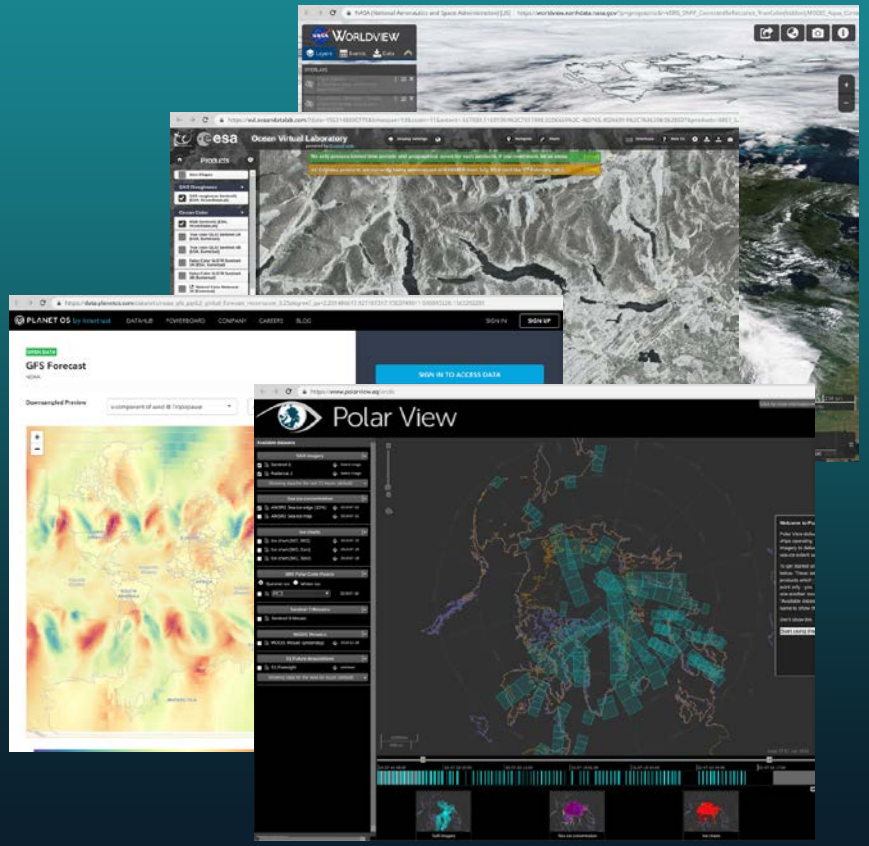
Why one more Web GIS solution?

Plenty projects allows browsing satellite data online:

- NASA worldview
- Planes OS
- Polar view
- ESA Ocean Virtual Laboratory

The Arctic Portal:

- Polar Stereographic projection
- Freely available
- Tool designed for research



Products available

- Sentinel-1 A, B NRCS - since 2015
- ASAR NRSC - 2007 - 2012

- MODIS RGB, Infrared - since 2017
- MODIS Mosaic - since 2017
- Sentinel-2 - occasionally

- ASCAT wind speed - since 2017
- NCEP wind speed - since 2016
- ERA INTERIM wind speed - 2003 - 2018

WRF forecast - since 2018
- Wind speed
- Pressure
- Temperature
- Rain rate

- AMSR2-based Bremen U. ice conc. - since 2003
- AMSR2-based SOLab ice conc. - since 2018

AMSR2-based characteristics - since 2017
- Atmospheric TWVC
- Atmospheric absorption
- Cloud LWC
- Rain rate
- SST
- Wind speed LF

The Arctic Portal features

Synergetic analysis

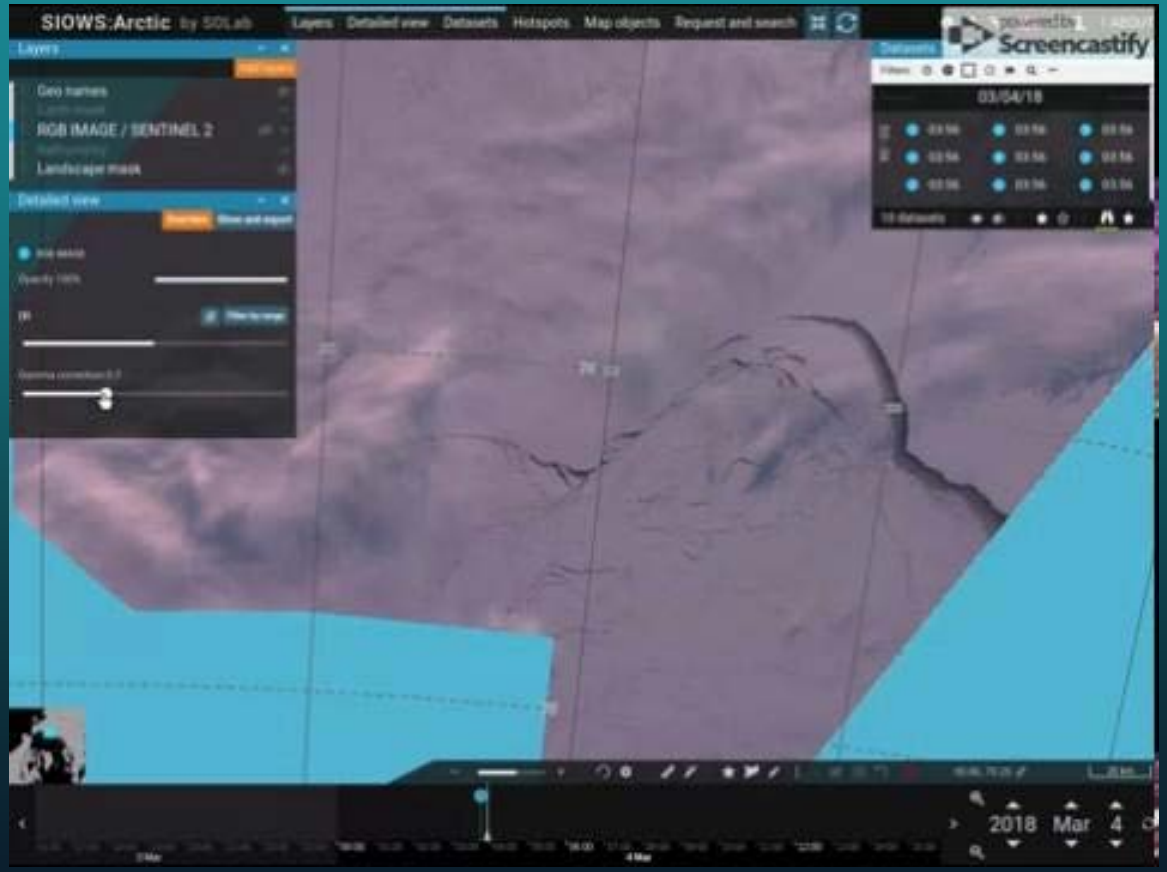
- managing with layers order, opacity, dynamic range, colorbar
- datasets filtering
- bathymetry and coastlines

The Arctic Portal features

Product-specific features

- Dual-polarized images for Sentinel-1
- Gamma-correction for HDR products (Sentinel-2)

- Raster and vector products
- Flow animation



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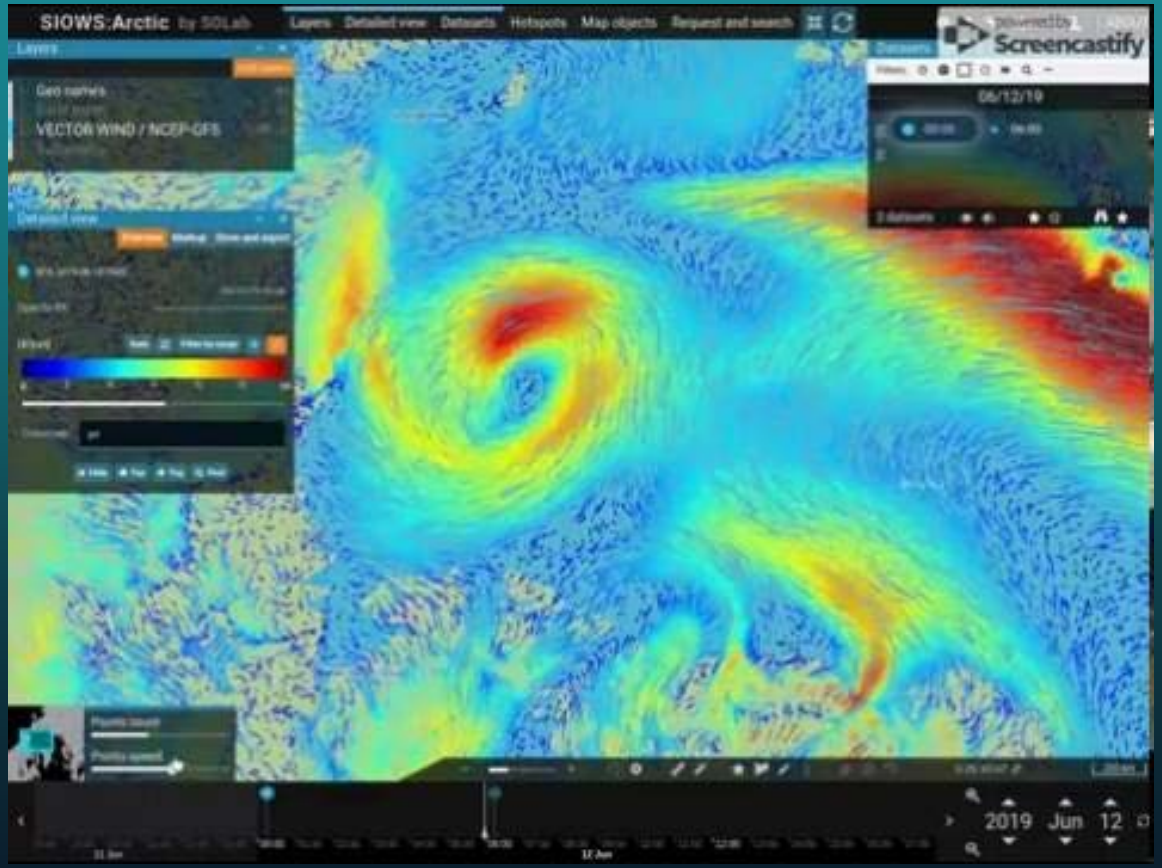
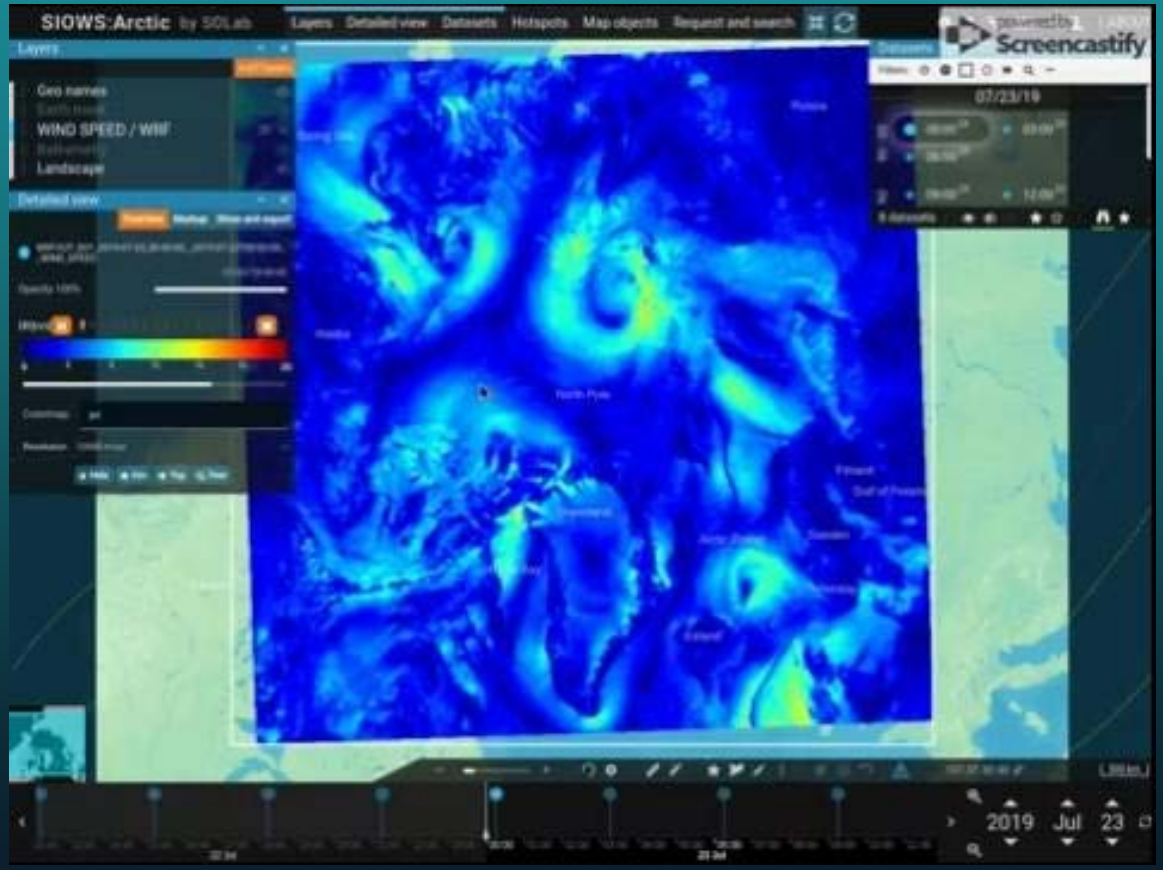


The Arctic Portal features

10km/px 2-days forecast by WRF model



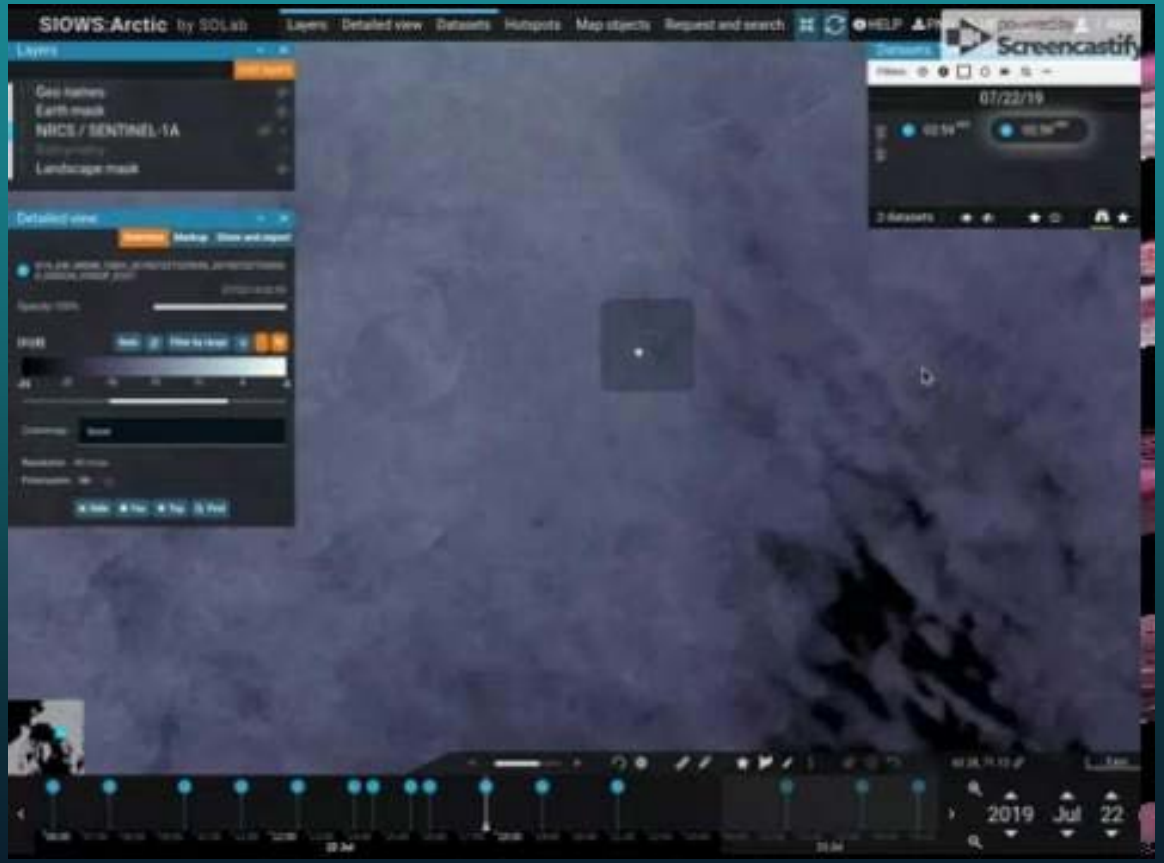
The Arctic Portal features

Tools to work online

- Value at point estimation
- Value along line graph (useful for internal waves investigation)

- Map drawing capabilities: lines and polygons, preset forms, view customization

- Different export options



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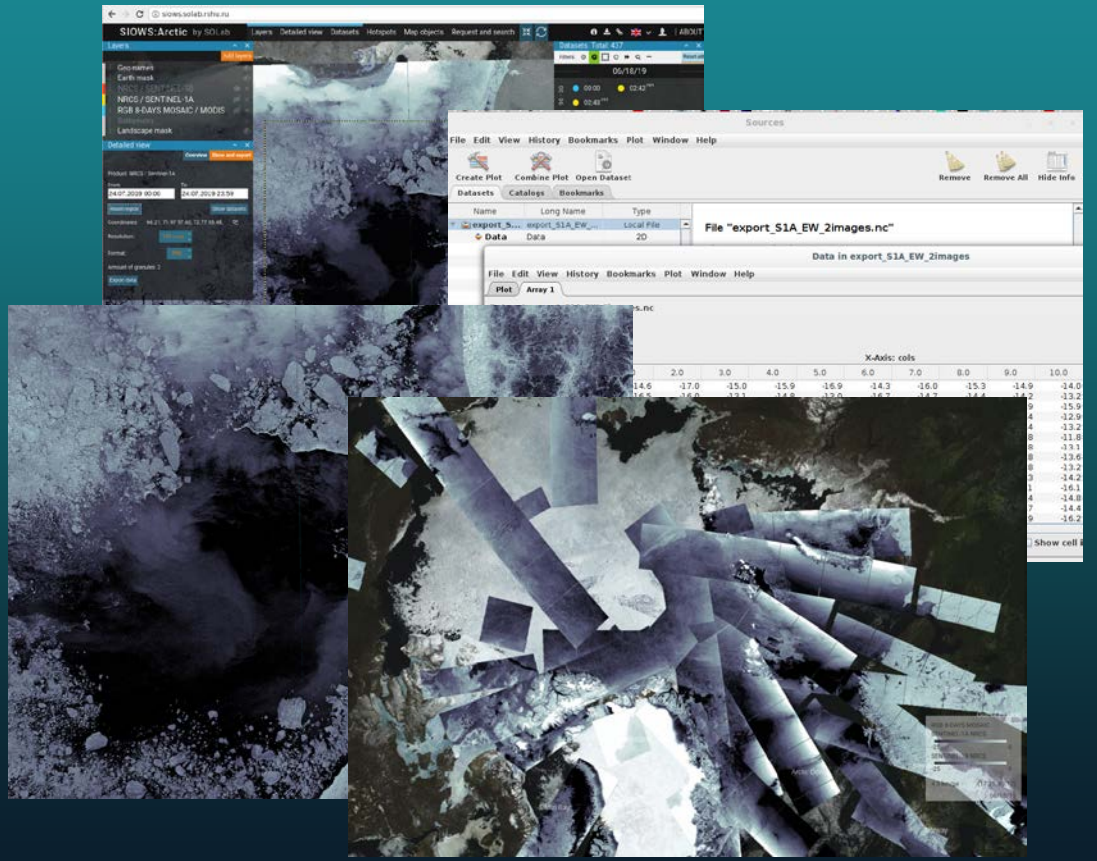
- Map drawing capabilities: lines and polygons, preset forms, view customization

- Different export options, sharing portal state via link



The Arctic Portal - technical details

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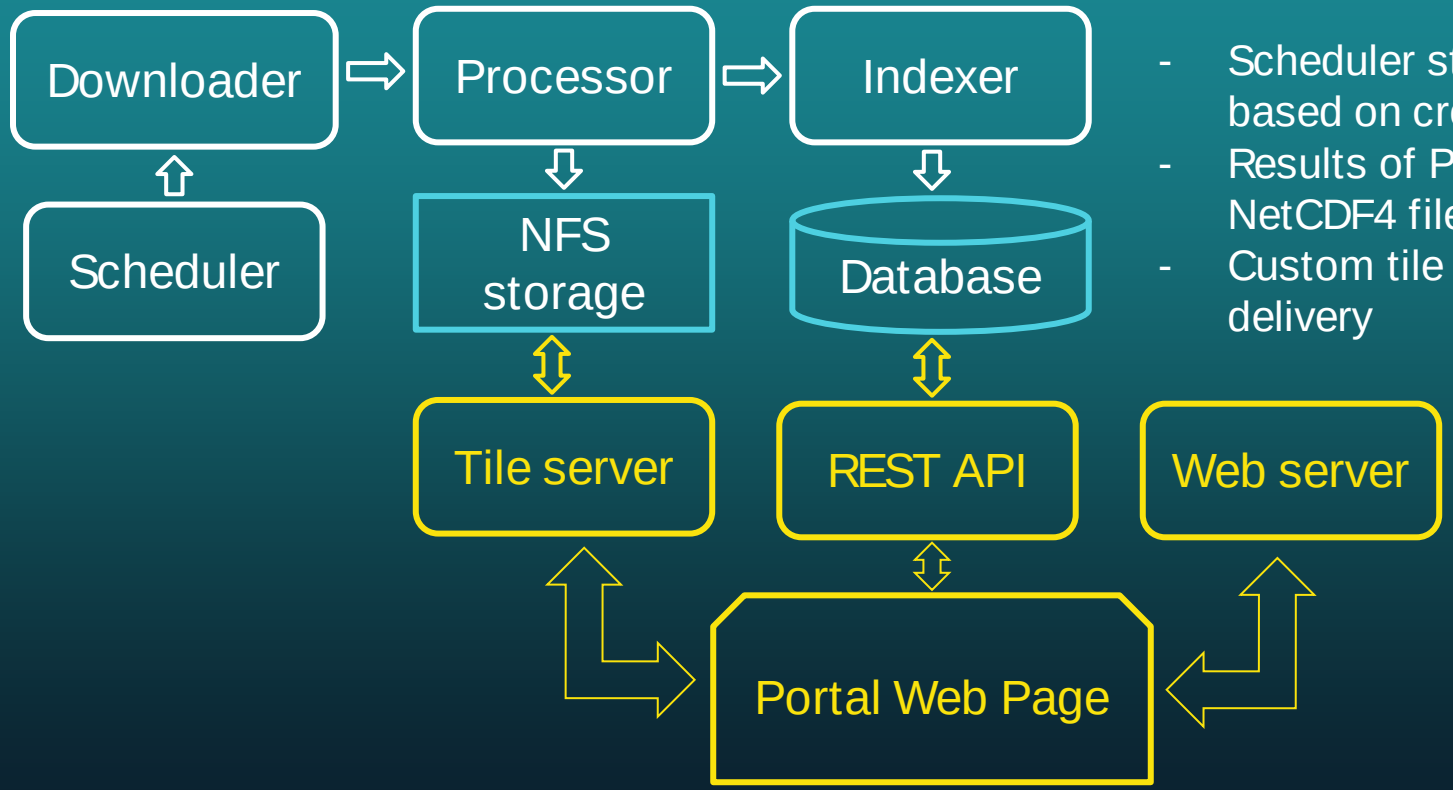


- Scheduler starts automatically, based on cron jobs
- Results of Processor are unified NetCDF4 files
- Custom tile server for fast tiles delivery

The Arctic Portal - technical stack

Backend:

- Python3 (Celery, Flask, Falcon, Peewee)
- Redis
- PostgreSQL
- Docker - based virtualization managed by Nomad

Frontend:

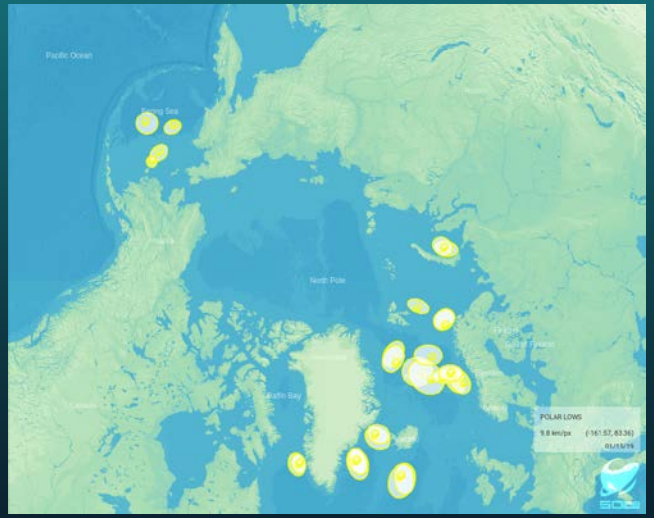
- React
- Openlayers 4
- NodeJS, MongoDB for web server

The Arctic Portal - practical usage

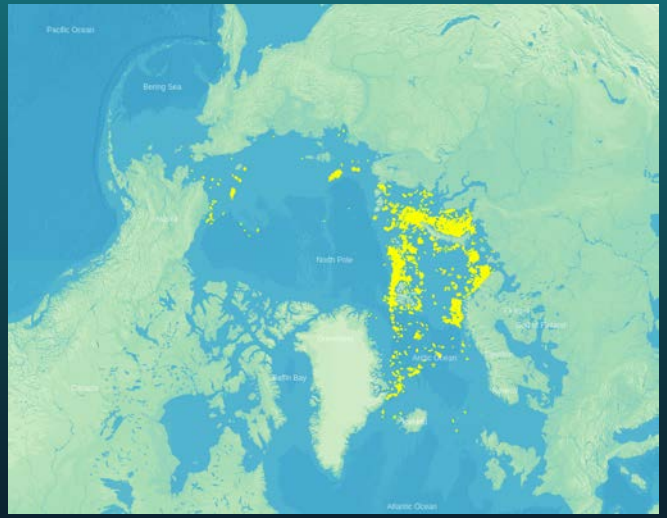
Portal allows to create user-generated products - phenomena, such as polar lows, oil spills, etc. using drawing on map tools

Use-cases from SOLab:

- Polar lows database creation
- Internal waves database extension



Polar lows for 01.2019



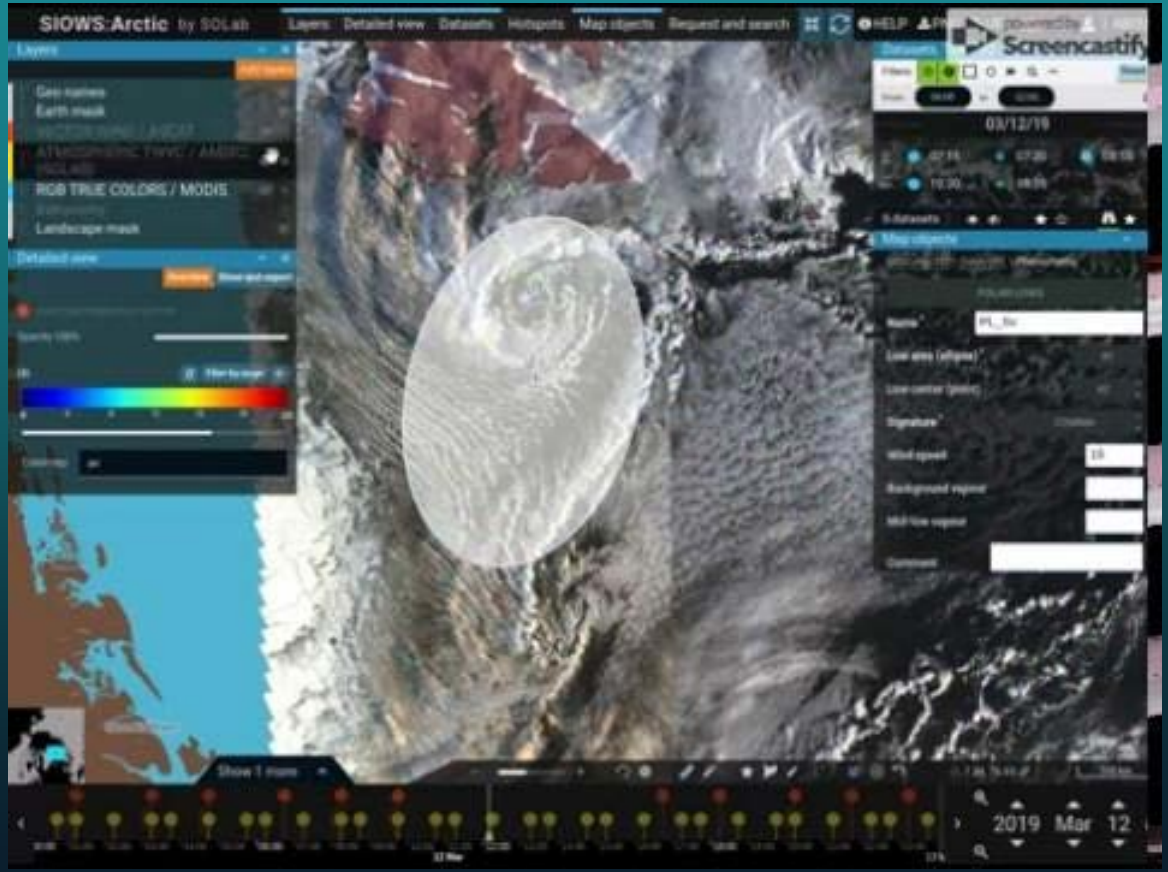
Internal waves 2007, 2011

These databases are not yet public, and available only for SOLab employees

The Arctic Portal - practical usage

The example of polar low discovery and saving

New user generated product types could be added to the Portal by Administrator without a necessity of programming



Thank you!

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Questions?