

## IcySea – Installation and Guidelines

### Registration

- Go to <https://icysea.app/register/> to register your email.
- You will receive a verification link, please check your Spam.
- Once your email address is verified you will receive your key number (=token).

### Installation via a (up-to-date) Chrome or MicrosoftEdge browser

- Open <https://icysea.app> and enter the token (copy paste, as the token is very long)
- You can now start using the app in the browser.
- To install IcySea as a stand alone App on the PC click on browser menu, generally three dots on the upper left in the browser bar.
- Now IcySea is installed on your PC and can be opened separately from the browser, and it will not use internet connection as long as no action is made (e.g. download a radar image).
- A how to install video can be watched here: [https://youtu.be/py93\\_SA4lmM](https://youtu.be/py93_SA4lmM)
- In principle IcySea also works on Smartphones, Tablets, iOS and MacOS systems and other browsers like Firefox and Safari. But the install button might be missing. Chrome seems to have the best performance for IcySea.

### First Steps in IcySea

A "first-steps-in-IcySea" video can be watched here <https://youtu.be/U5hYOnZ-ylo>

- The main tool in IcySea is the menu in the upper right corner, the three information layer buttons. Clicking them activates and deactivates them in the map display. For each layer there is a "?" symbol to learn more about what data the layer shows.
- Another main tool is to right click the map in a region where you see the small square tiles. In the pop-up menu you can chose to download a low-res radar image (40 kbyte) or a high-res radar image (1.7 mbyte) on demand.
- The measuring distance tool, right-click on the screen select "measure distance". This tool supports measuring distances along a straight line, but also supports measuring distances along paths. In addition, users can draw multiple paths simultaneously, which for example, allows to compare the length of potential routes through the ice!
- Classified Sentinel 3 images are kindly provided by König und Partner Fernerkundung GbR (<https://lnkd.in/edcWq9kX>). These optical image provide automated information on ice classes (young ice, thick ice, with or without snow cover, etc), these classes are not yet validated and need to be used with care. The classification algorithm is subject to ongoing research within the EisKlass2 project. Note that this product includes a single image at a time, which might cover a different area from the previous image. Currently available in the Arctic.
- In the upper left corner of the screen you find another menu for information, contact us, user position, data export and settings.
- To switch between polar regions click on the settings menu ("wheel" symbol) and select "Show arctic" or "Show antarctic".
- To rotate the map on a computer, click on the keys ALT+SHIFT and drag your mouse.

## GPS sensor

### Requirements

- GPS sensor which provides the position via serial port (USB) or system which provides the position via virtual serial port. We recommend using the 'DIYmalls VK-162 G-Mouse Remote Mount USB GPS Dongle' as this device was used during the development of the user position feature.
- Chrome or Edge (other browsers don't provide the WebSerialAPI)

### Manual

- Connect the GPS sensor to your system or set up the virtual serial port.
- Start IcySea
- Within the settings dialog (click on the cog wheel symbol) go to *User position* and select *Connect to GNSS sensor via serial port.* and set the baud rate. The baud rate depends on the sensor you're using.
- Close the settings dialog.
- Click the locate button (cross hairs).
- A dialog for selecting the GPS device (serial port) appears. Select your device and confirm.
- Your position is highlighted on the map.

### Troubleshooting

#### My position isn't displayed on the map

Please make sure that the GPS receiver works properly and is able to calculate a position. If you're working on a Linux-based system you can do this with e.g. *gpsmon* which is part of the *gpsd-clients* package (Debian). Also ensure that the sensor has a direct line of sight to the sky and that there isn't too much coverage by e.g. buildings. It is recommended to use the GPS sensor outdoors. (ex: On the Endurance22 expedition we had taped the GPS receiver to a window and this worked fine.)

### Tips:

- To see the age of a radar image tile, click on the watch symbol in the upper right corner which is part of the "Sentinel-1" button.
- The age of the sea-ice concentration layer is shown in the lower left corner above the sea ice concentration colour legend. And directly on the downloaded tiles, if the age does not appear on the tiles, please zoom in.
- If you are not sure how to interpret a Sentinel-1 radar tile, compare the Sentinel-1 image with the sea-ice concentration layer, by toggling the Sentinel-1 layer on and off. Then you can immediately judge if a larger area is generally open water or a closed ice cover.
- Read the information by clicking on the "?" symbol beside each layer.
- Display position taken from the web browser or via a mqtt address provided by the ships IT infrastructure. You can select your preferences in the settings menu.
- Export displayed data as georeferenced images to use it in another software (e.g. GIS or ENC). <https://youtu.be/ji4FUiSnbss>
- Distance measurement tool, you can

### Approximate data usage information :

When using a satellite data connection it is important to know how much data is transferred when installing and using the IcySea application. Below is a list of *approximate* data usage amounts for various aspects of the application:

Information to download	Data transfer size
Application installation (landmask only)	~5.7 MB
Sea-ice concentration	~136 kB
Ice drift forecast	~176 kB
Sentinel-1 low resolution tile	~28 kB
Sentinel-1 high resolution tile	~1.7 MB
Tile age information	0 kB (information is computed in app)
Classified Sentinel-3 optical image	<2.5 MB