

# Workshop Reading satellite pictures

Solstakäret & HLSK co-production  
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## **PART I – Where to look**

1. Internet sites
2. Instrument MODIS
3. The main three sites for MODIS images

## **PART II – How to look**

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# **PART I – Where to look**

## Searching

"satellite pictures" → 112.000.000 hits

"satellite pictures ice and snow" → 5.680.000

"satellite pictures ice and snow sweden" → 279.000

"satellite pictures ice and snow sweden today" → 480.000 (?)

## Example sites

[NASA Earth Observatory](#)

[The Guardian](#)

[The Finish Times](#)

[CryoLand Client](#)

[ESA Sentinel](#)

# Where to look (1)

## The magic word

Turns out to be MODIS

## MODIS

**M**ODerate-resolution **I**maging **S**pectroradiometer on board NASA Terra and Aqua satellites.

Terra's orbit around the Earth is timed so that it passes from north to south across the equator in the morning, while Aqua passes south to north over the equator in the afternoon.

Together the instruments image the entire Earth every one to two days.

## Where to look (2)



## **Status of LANCE Rapid Response MODIS images**

A large disk array containing several years of imagery (Near real-time (Orbit Swath) and MODIS Subset Images) suffered a hardware failure.

This disk contained imagery from about January 2011 to mid-December 2013.

We are working to recover it but, at present, the prognosis for recovery is very uncertain.

## Source level tool

Rapid response = near real time images

All “raw” images in different resolutions and colors

[NASA EarthData](#)

## Summary level tool

NASA Worldview software

Worldview shows the Earth as it was in the past 24 hours

[NASA WorldView](#)

## Skating level tool

Oskar Karlin’s website Icefinder

Shows MODIS images for southern Sweden in a convenient way

[www.icefinder.se](#)

# Where to look (3)

## **PART II – How to look**



# Lesson 1 - Lake recognition

It is important to know which area you are looking at. Some tricks to train yourself well:

1. Put the map next to your laptop
2. Learn by heart ten lakes in each province of Sweden, just by shape
3. In WorldView, get a feeling for the angle of the satellite pictures; step back to Icefinder if you get confused
4. Practice with pointing to a lake from picture to map, but also from map to picture. One direction is not good enough

Examples: practice with 10 lakes in Sweden

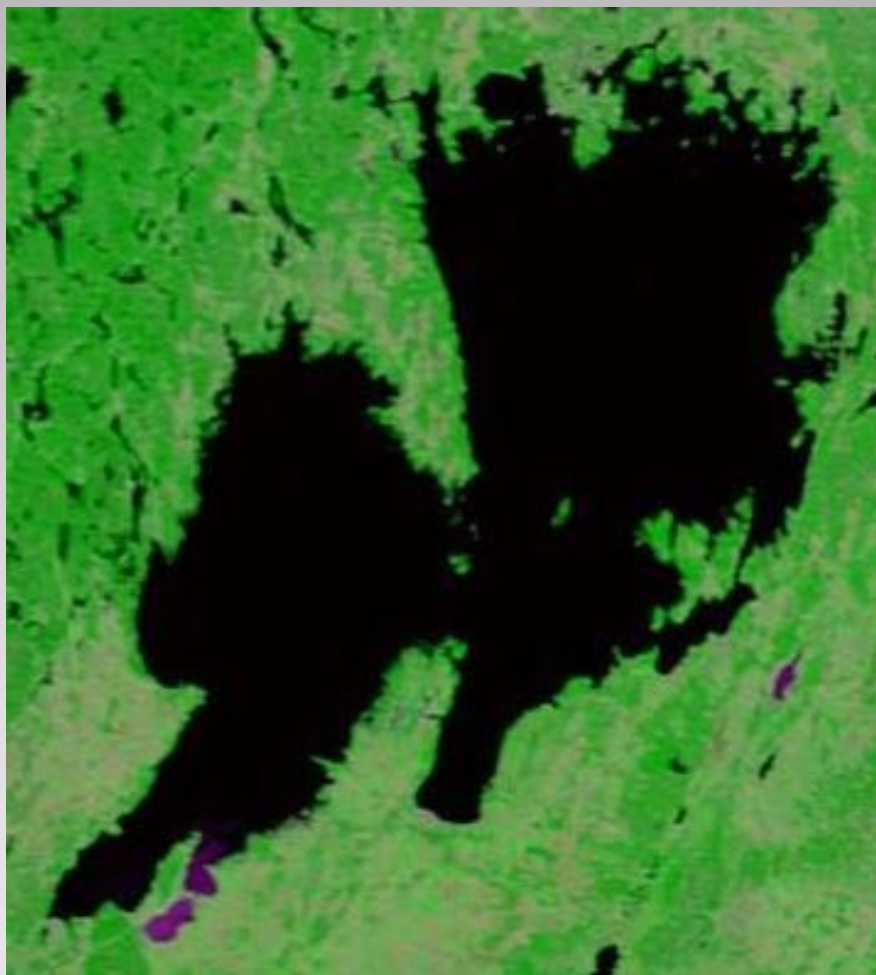
## How to look (1)



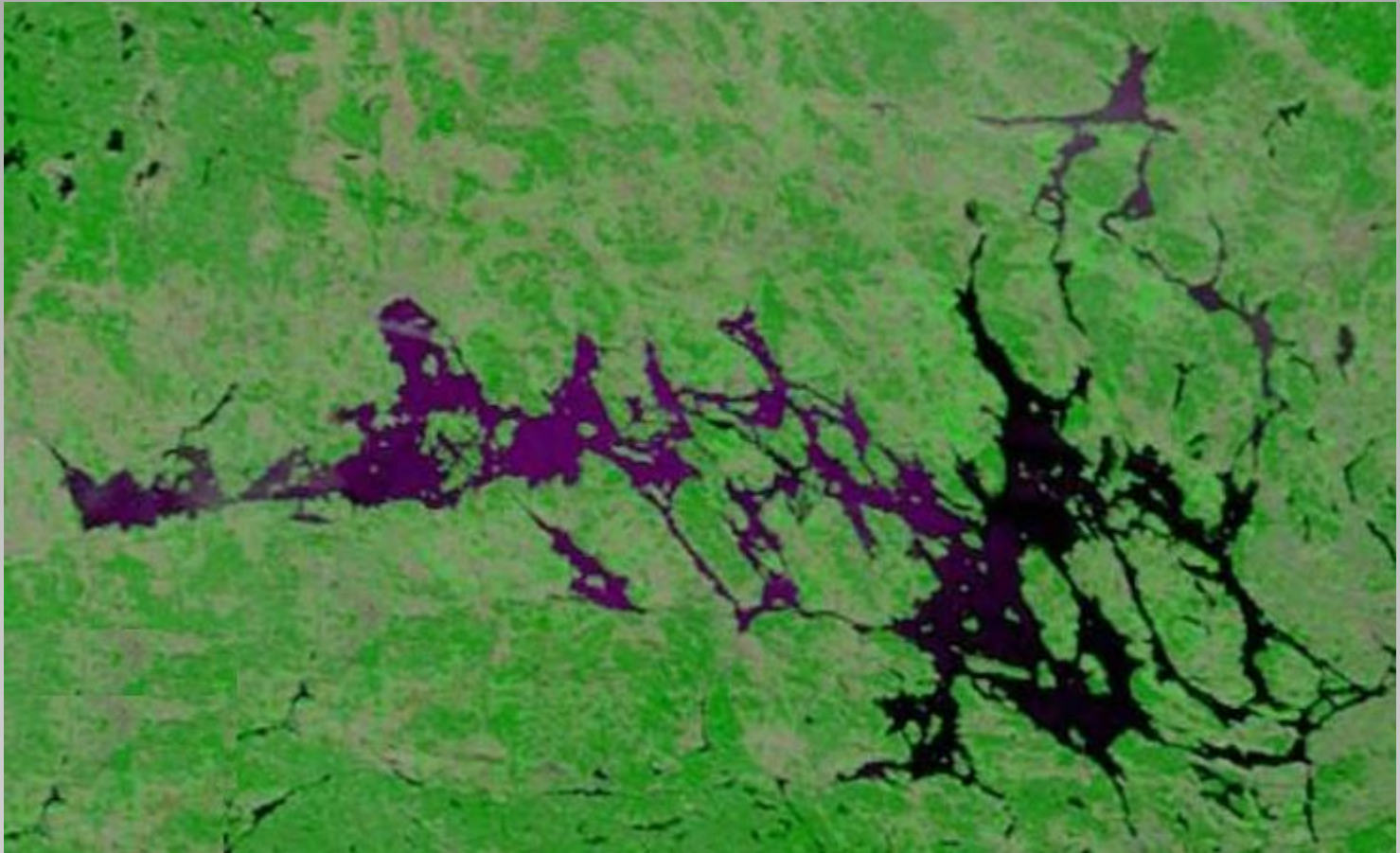
**Vättern**

Icesat

WorldView



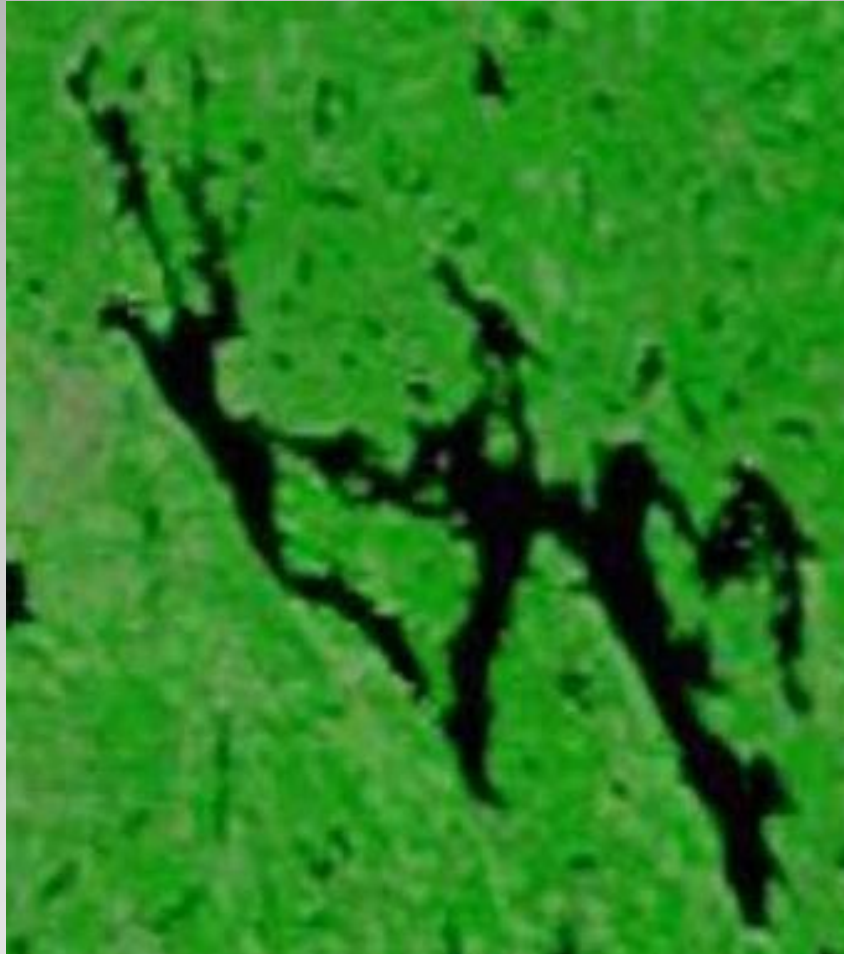
**Vänern**



**Mälaren**



**Hjälmarén**



**Sommen**



**Bolmen**



**Fryken**





**Mjörn**



**Ivösjön**



**Stora Gla**

## Lesson 2 - Clouds and snow determination

Clouds and snow are easily confused. Some tricks:

1. find a big lake you know for sure is open water, with snow around and clouds over it: then you see the differences
2. find shadows from mountains and check sharp snow lines of the shadow (cloud lines are usually more blurry)
3. find shadows from clouds which means it must be a cloud instead of snow

Watch out: shadows of mountains look like skateable lakes!

### Example

Area around lake Femunden, 13 november 2013, in Icefunder

## How to look (2)

## Lesson 3 - Stöpis categorization

The story goes "darker grey or velvet is better skateable stöpis".

This is not true. White ice can be perfectly skateable, while grey ice can be rough ice, drevad snö or anything else. It is only the color *difference* that says something. Some tricks:

1. Find färdrapporter with pictures from the ice to get a feel which color is which ice and find corresponding satellite pictures
2. Compare two or three reference colors of ice situations within an area to guess what the color scale means
3. Then search for comparable color with good ice situation on different lakes

Example: compare isobs of Skagern, Unden, Viken from 1 to 7 april 2013 with satellite pictures in WorldView.

## How to look (3)

## Lesson 4 - Water and black ice determination

The difference between black ice and water is very difficult to see. Some tricks:

1. Look at lakes /dates where you suspect there is new ice
2. Compare 7-2-1 and True color pictures for the same lake or area on a lake
3. Zoom in and out on the same area and look for color changes
4. Look at your screen from different angles
5. Step back in days to estimate the number of freezing nights for black ice (check the weather history)

But watch out: black ice can still be too thin!

Example: Vänern, 11 march 2013, in WorldView

# How to look (4)

## **PART III – In reality**

# Five real life cases

Start [powerpoint](#)

**Real life cases**



## Exercise

During 2013/2014 two groups of HLSK skated a nice tour on Muritz in Germany.

On which day during 2012/2013 do you think Muritz might have been skateable as well?

**Exercise (1)**

## Exercise

Without looking at Skridskonätet, do you think Gapern was skateable or not on 22 January 2014?

If you judge Gapern as skateable, do you think it was stöpis or kärnis or both?

When you answered both questions, check your answers on Skridskonätet.

## Exercise (2)