Multibeam Mapping in the Search for Remains of the Viking-age Trading Center “Birka” in Lake Mälaren, South Central Sweden

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All three countries use the Roman Iron Age for the time period up to 400 AD. Then there are differences:

**Norway:** The Late Iron Age: The Migration Period 400-570/600, the Merovingian Period 570/600-800 and the Viking Age 800-1050.

**Sweden:** The Late Iron Age (400-1050) includes the Migration Period 400-550, The Vendel period 550-750 and the **Viking Age 750-1050**.

**Denmark:** The Germanic Iron Age 400 AD – 750/800 AD. This period is divided into the ‘Early Germanic Iron Age’ or the Migration Period 400 – 550, The Later Germanic Iron Age’ 550-750. Then follows the Viking Age 750/800-1050.
Birka on Björkö Island (eng. Birch Island)

1. Björkö is located in Lake Mälaren, West of Stockholm
2. Mälaren is the third largest lake in Sweden, 1 120 km\(^2\)
3. Birka was a Viking-age trading center on Björkö established sometime after 750 A.D.
4. Birka was inhabited until the end of the 10\(^{th}\) century
5. Birka became one of the first Christian congregations in Sweden
6. Mälaren was during the Viking time a part of the Baltic Sea, it became a lake due to isostatic rebound at about 1000 A.D. This means a perfect setting for a protected harbor with access to the World Ocean through the Baltic Sea
“Valkyriefigur” in silver. These were Oden’s female servants who picked out those who would die at the battlefield.

Location of about 1600 graves

“The Viking City” Where the Birka wall was

Location of about 1600 graves

Glass cup found at Birka
Ambrosiani and Eriksson, 1996
What do we like to find?

- Small Viking-boats used locally
- Large Viking-ships (a dream!)
- More remains of the pole protection establishment

No ships have been found!!
Geophysical mapping, May 2011

- Kongsberg EM2040, 200-400 kHz, mapping in max 500 m water depth with decimeter to cm resolution
- Meridata subbottom profiler, 28 kHz
- EdgeTech TD272 Sidescan sonar, 500 kHz
A tipped over ship or entrance to mystic underwater housing?
first we thought these were poles
First we thought these were poles.
To be further analyzed.....
Bonus survey

2011-11-16 / Martin Jakobsson, Department of Geological Sciences
**Sister ship “Rospiggen”**

**Specifications**
- Length: 33.76
- Width: 7.66 m
- Sunk: 1969-04-04

- *M/S Marjaana* was built for Underås Sandtag AB in 1944 and was first called *Underås Sandtag II*. The ship was used to carry sand to be used for concrete.
- The ship was sold in 1965 and renamed to *M/S Marjaana*. She continued to carry sand for Underås AB in Mälaren.
- *M/S Marjaana* sunk 1969 after a collision with a hard ice edge on the side of the lead just before Easter.
- All onboard survived except for the ship dog who went back to his cabin to get away from the commotion.
Sister ship Rospiggen
Resolution Addition to our Antarctic Mapping Activities

Swedish Icebreaker Oden
Stockholm University multibeam systems
Oden: Kongsberg EM122
Portable: Kongsberg EM2040

Financed by:
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SBP120
3-7 kHz (chirp), 3° x 3°

EM122
12 kHz (chirp), 1° x 1°
What will higher resolution give us next!

Swedish Arctic Ocean Investigation of Climate-Cryosphere-Carbon Interactions – The SWE-C3 Program –

Two Leg Expedition 2014