

The Nordic Microalgae Information System

and other possible contributions to the construction of a marine virtual lab

LifeWatch marine thematic technical workshop

3-5 May, 2014



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Gothenburg office



Norrköping headquarter

The National Oceanographic Data Centre at SMHI

Database SHARK holds most of the Swedish marine monitoring data

- Biology
 - Bacteria
 - Phytoplankton and chl. *a*
 - Zooplankton
 - Benthic fauna
 - Macro flora
 - Sea mammals
 - Etc.
- Physics and chemistry
 - Salinity
 - Temperature
 - Secchi depth
 - Oxygen
 - Inorganic nutrients
 - Total P and N
 - Particulate C and N
 - CDOM
 - Etc.



Physics and chemistry

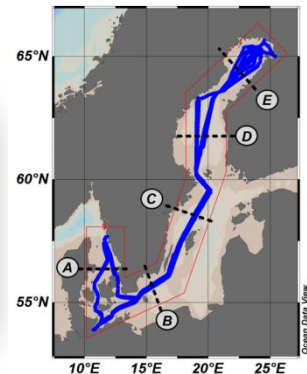
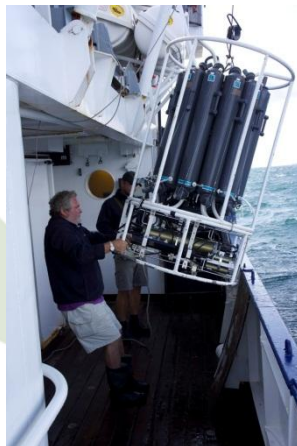
Water sampling

85 904 sampling occasions
660 249 water samples

- Salinity
- Temperature
- Nutrients
- Oxygen
- Chlorophyll
- Etc.

”Automated” systems

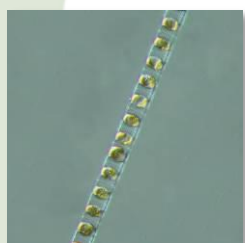
- Light ship data
- CTD-data
- Oceanographic buoys
- FerryBox-system, e.g. CO₂ and pH
- Water level gauges



Biodiversity data from surveys, national and regional monitoring



| | Number of sampling events |
|---------------------|---------------------------|
| Pelagic bacteria | 1429 |
| Grey seals | 6271 |
| Harbour seals | 6163 |
| Macrophytes | 5213 |
| Sedimentation rates | 1113 |
| Benthic fauna | 8340 |
| Phytoplankton | 1329 |
| Zooplankton | Info missing |



From www.smhi.se/sharkweb 2 December 2013

Part of a large network



Nationella och regionala dataleverantörer



Havs och Vatten myndigheten



CIEM



OSPAR COMMISSION

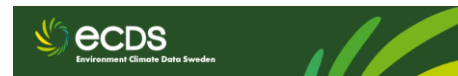


European Environment Agency



EMODnet

European Marine Observation and Data Network



ecds

Environment Climate Data Sweden



SeaDataNet



User

MyOcean

JERICO



VATTENMYNDIGHETERNA

VISS - VattenInformationsSystem Sverige

ArtDatabanken
Swedish Species Information Centre



Flows of data

National marine monitoring
Regional marine monitoring
Surveys
SMHI:s automated systems
Oceanographic buoys
FerryBox System
mätsystem
Historic data
m.m.



UNESCO-IOC
ICES
EEA
Lifewatch
EMODNET
MyOcean II
SeaDataNet
SwAM
NV
Länsstyrelser
Havsmiljöinstitutet
m.m.

Swedish Oceanographic Data Centre

www.smhi.se/sharkweb

SMHI Vädret Klimatdata Professionella tjänster Kunskapsbanken Forskning 1 Varning klass 1. Svårare

Havs och Vatten myndigheten **Marina miljöövervakningsdata**

På uppdrag av Havs- och vattenmyndigheten är SMHI nationell dataleverantör för marina miljöövervakningsdata. På den här sidan går det att söka efter och leda ner biologiska havsmiljödata. Mer information finns [här](#).

Hämta data: Provtagningsfallförmågor Databasens innehåll

RESULTAT PROVER OCH MÄTVÄRDEN (13306 VÄRDEN)

Välj parameter/enhet:

- # counted - ind/analysed sample fraction
- Abundance - ind/l or 100 µm pieces/l
- Biovolume concentration - µm³/l
- Carbon concentration - ng C/l
- Carbon concentration - µgC/l (mgC/m³)

Välj som tabell:

Kolumner: Översikt

Rubrikrad: Svensk

Utlämna samma kolumner

[Rensa] [Sök]

Välj som diagram:

Diagram: Standard

[Rensa] [Sök]

År: 2012 - 2012

Detertyp: Phytoplankton

Parameter: Alla

Månader: Alla

Beställare: Alla

Undersökning/projekt: Alla

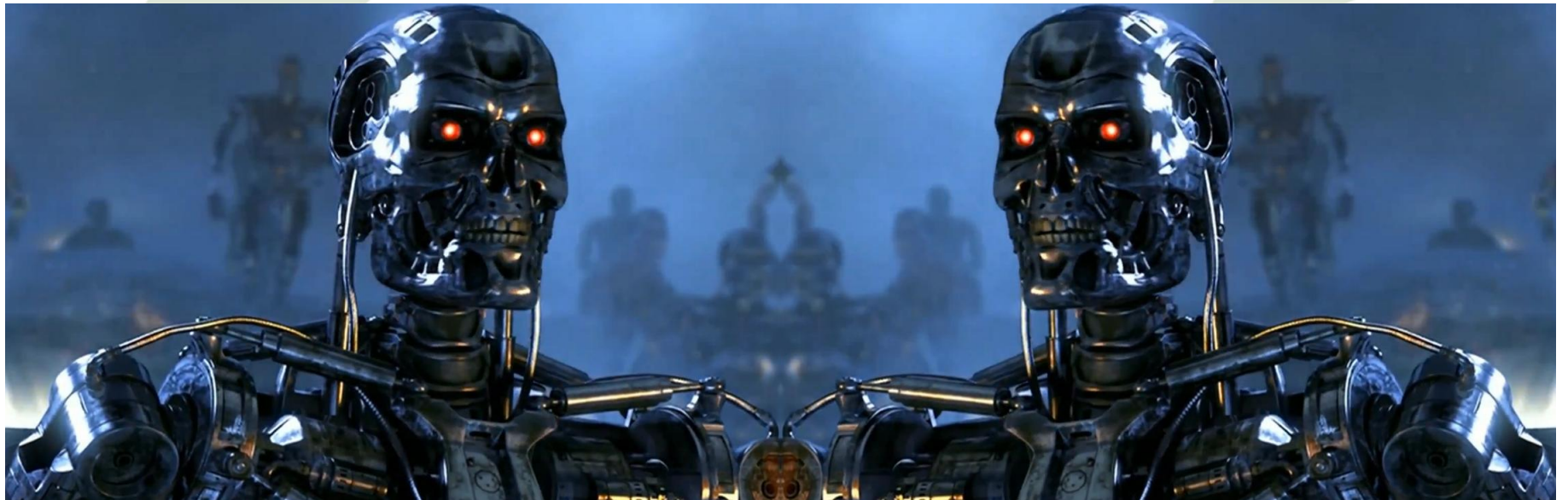
Stationsnamn: Innehåller

Art/taxon-namn: Del av namn eller högre taxa

Geografisk avgränsning (ej aktiv): Kan aktiveras till höger om kartan.

RESULTAT PROVER OCH MÄTVÄRDEN (88 POSITIONER VISA S PÅ KARTAN)

Machine – Machine communication



Datasets

Import new dataset Delete all Reload all

Available datasets

| Datatype | Dataset name | Metadata | Data | Version | Dataset file name |
|------------|--|--------------------------|----------------------|----------------|--|
| Speciesobs | SHARK_Speciesobs_1992-1995_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_1992-1995_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_1996-1999_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_1996-1999_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2000-2002_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2000-2002_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2003-2005_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2003-2005_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2006-2007_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2006-2007_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2008-2009_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2008-2009_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2010-2011_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2010-2011_Phytobentos_version_TEST2014-03-0 |
| Speciesobs | SHARK_Speciesobs_2010_Zooplankton | Metadata | Data | TEST2014-02-14 | SHARK_Speciesobs_2010_Zooplankton_version_TEST2014-02-14.zip |
| Speciesobs | SHARK_Speciesobs_2012_Phytobentos | Metadata | Data | TEST2014-03-06 | SHARK_Speciesobs_2012_Phytobentos_version_TEST2014-03-06.zip |

Species observations

Update

Reload

Clean up

Species observations filter

Year from: 2007 ▾

Year to: 2009 ▾

Scientific name: Homarus gammarus ▾

As reported on various rank.

Class: All ▾

Including taxa of lower rank.

Order: All ▾

Including taxa of lower rank.

Species: All ▾

Including taxa of lower rank.

View data

View example URLs

Clear

Species observations

| occurrenceID | Data Type | scientificName | scientificNameAuthorship | decimalLatitude | decimalLongitude | eventDate | year | month |
|----------------------------------|--------------|------------------|--------------------------|-----------------|------------------|------------|------|-------|
| 022bce078f11ddbba26f323e965eb57d | Phytobenthos | Homarus gammarus | - | 57.37391 | 11.85557 | 2007-08-11 | 2007 | 8 |
| 0686506a3b813086b89307011f05b3a9 | Phytobenthos | Homarus gammarus | - | 57.43337 | 11.89516 | 2008-07-22 | 2008 | 7 |
| 35b619e73d3c7e95022f3d9baa6540cd | Phytobenthos | Homarus gammarus | - | 57.43337 | 11.89516 | 2009-08-03 | 2009 | 8 |

Order:

Including taxa of lower rank.

Species:

Including taxa of lower rank.

[View data](#)

[View example URLs](#)

[Clear](#)

Example URLs

/speciesobs/table.txt/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus&page=1&per_page=10

/speciesobs/table.json/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus&page=1&per_page=10

/speciesobs/table.json/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus&page=1&per_page=10&view_deleted=true

/speciesobs/table.txt/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

/speciesobs/table.json/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

/speciesobs/positions.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

/speciesobs/year_info.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

/speciesobs/map/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

http://maps.google.se/?q=http://sharkdata.se/speciesobs/positions.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

http://maps.google.se/?q=http://sharkdata.se/speciesobs/year_info.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

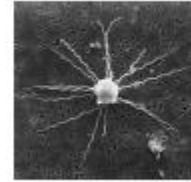
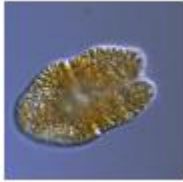
For development (from <http://test.sharkdata.se>):

http://maps.google.se/?q=http://test.sharkdata.se/speciesobs/positions.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

http://maps.google.se/?q=http://test.sharkdata.se/speciesobs/year_info.kml/?year_from=2007&year_to=2009&scientific_name=Homarus gammarus

Information system for microalgae

SMHI



www.nordicmicroalgae.org

- Cooperation with Nordic countries and all countries surrounding the Baltic Sea
- Connected to Dyntaxa and www.algaebase.org
- Users contribute content
- Phytoplankton
- Benthic microalgae
- Mikrozooplankton
- Taxonomic information
- Images
- Video
- Biovolume
- Carbon content
- Harmfulness

www.smhi.se/sharkweb

- Database with quantitative data
- PostgreSQL
- Data is freely available
- Web feature services sharkdata.net

Plankton Toolbox

- Analysis tool
- Open source software for Windows, Mac och Linux
- Aggregate data
- Statistics
- Plotting
- Etc.

Nordic Microalgae

www.nordicmicroalgae.org

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Nordic Microalgae *and aquatic protozoa* LOG IN | REGISTER

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[Introduction](#) Latest Images How to contribute Hall of fame Partners NOMP HELCOM-PEG Links Literature Search

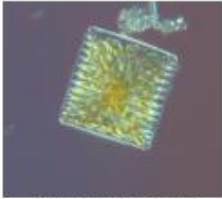
Introduction

Visit mobile version. m.nordicmicroalgae.org adapted for handheld devices is also available.


Welcome to Nordic Microalgae

The web site is a source of information about microalgae and related organisms in the Nordic area, i.e. the Baltic Sea, the North East Atlantic and lakes, rivers and streams in the area. This site is of use for science, education, environmental monitoring etc. The content of the site is mainly supplied by the users.


Latest added illustrations



Striatella unipunctata
Nov 5, 2013
Ann-Turi Skjevik



cf. cyst of Protoperidinium oblongum
Nov 5, 2013
Mats Kuylenstierna



Chaetoceros brevis
Nov 1, 2013
Ann-Turi Skjevik

RECENT NEWS

Image of Chaetoceros debilis winner
2 Nov 2013 - 20:58
[Read more](#)

HELCOM-PEG 2013
1 Nov 2013 - 15:55
[Read more](#)

NOMP - Nordic Marine Phytoplankton Group
1 Nov 2013 - 14:08
[Read more](#)

[News archive](#)

STATISTICS

Number of species: 4486
Number of taxa: 6600
Number of images: 1509
Number of videos: 1
Number of contributors: 46

SMHI

Nordic Microalgae is developed and operated by the Swedish Meteorological and Hydrological Institute (SMHI) with funding from the Swedish LifeWatch project.

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LIFEWATCH

SVENSKA
LIFEWATCH

Taxon sheets

Nordic Microalgae and diatoms project **LIFEWATCH** LOG IN | REGISTER

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CLASSIFICATION

Akashiwo sanguinea (Hirasaki) G.Hansen & Moestrup, 2000

Kingdom: Protista
 Phylum: Rhodophyta
 Class: Dinophyceae
 Order: Gymnodiniales
 Family: Gymnodinaceae
 Genus: Akashiwo
 Species: Akashiwo sanguinea

TAXONOMY

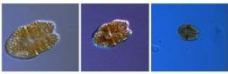
Protista
 Rhodophyta
 Dinophyceae
 Gymnodiniales
 Gymnodinaceae
 Akashiwo
 Akashiwo sanguinea



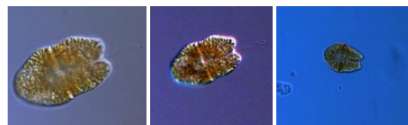
View image in original size

Akashiwo sanguinea
 Photographer/ist: Ann-Turi Skjerve

Additional information



Additional information



Description

IDs in other systems

- Dynamic taxa ID: 238409
More info at <http://www.artdata.slu.se/dyntaxa>.
- AlgaeBase ID: 40273
More info at <http://algaebase.org>.

Morphology

Often pentagonal with broadly conical epicone and a bilobed hypocone. Sulcus does not extend on to the epicone. Many small chloroplasts. Nucleus large and central. The girdle slightly left-handed displaced

Other remarks

Toxic (?). Can produce small cells (Silva & Faust 1985)
 Distribution: Worldwide in coastal waters

Life form

Solitary

Size

length 40-80 µm

Resting spore

+


Literature

Drebes, G. 1974. Marines Phytoplankton, Eine Auswahl der Helgoländer Planktonalgen (Diatomeen, Peridinee). Georg Thieme Verlag, Stuttgart. 186 pp.
 Hansen, G. & Larsen, J. 1992. Dinoflagellater i danske farvande. In: Thomsen, H. A. (ed.) Plankton i de indre danske farvande. Havforskning fra Miljøstyrelsen, Copenhagen, p. 45-155.
 Silva, E. S. & Faust, M. A. 1995. Small cells in the life history of dinoflagellates (Dinophyceae): a review. Phycologia. 34: 396-408.
 Steidinger, K. A. & Tangen, K. 1996. Dinoflagellates. In: Tomas, C. R. (ed.) Identifying marine diatoms and dinoflagellates. Academic Press, Inc., San Diego, p. 387-584.
 Lebour, M. V. 1925. The dinoflagellates of northern seas. Mar. Biol. Ass. U. K., Plymouth. 1-250.

External links



Biovolumes

| | | | | |
|---|--|---------|---------|--------|
| Species | Akashiwo sanguinea | | | |
| Author | (Hirasaki) G. Hansen & Moestrup 2000 | | | |
| Division | DINOPHYTA (PYRROPHYTA) | | | |
| Class | Dinophyceae | | | |
| Order | GYMNODINIALES | | | |
| Trophy | AU | | | |
| Geometric shape |  Flattened ellipsoid | | | |
| Formula | p/6*1*d1*d2 | | | |
| Size class | 1 | 2 | 3 | 4 |
| Unit | cell | cell | cell | cell |
| Size range | 60x40 | 80 x 40 | 90 x 45 | 50x35 |
| Length(l1), µm | 60 | 80 | 90 | 50 |
| Diameter(d1), µm | 40 | 40 | 45 | 35 |
| Diameter(d2), µm | 26.8 | 26.8 | 30.15 | 17.5 |
| No. of cells/counting unit | 1 | 1 | 1 | 1 |
| Calculated volume, µm3 | 33 661 | 44 881 | 63 903 | 16 027 |
| Comment | HD fact=0.5 | | | |
| Calculated Carbon pg/counting unit | 3 850 | 5 044 | 7 028 | 1 918 |

Source

Olenina, I., Hajdu, S., Edler, L., Andersson, A., Wasmund, N., Busch, S., Göbel, J., Gromisz, S., Huseby, S., Huttunen, M., Jaanus, A., Kokkonen, P., Ledaine, I. and Niemkiewicz, E. 2006 **Biovolumes and size-classes of phytoplankton in the Baltic Sea HELCOM Balt. Sea Environ. Proc. No. 106, 144pp.** (PDF), [HELCOM PEG Biovolume, PEG_BVOL2011.xls](#)

Change History

- 2011-10-03 08:17:59 **Malin Mohlin** - Updated media metadata for Akashiwo sanguinea_3.jpg
- 2011-10-03 08:17:38 **Malin Mohlin** - Added media: Akashiwo sanguinea_3.jpg
- 2011-10-03 08:15:24 **Malin Mohlin** - Updated media metadata for Akashiwo sanguinea_2.jpg
- 2011-10-03 08:15:14 **Malin Mohlin** - Added media: Akashiwo sanguinea_2.jpg
- 2011-10-03 08:14:58 **Malin Mohlin** - Updated media metadata for Akashiwo sanguinea_1.jpg
- 2011-10-03 08:13:21 **Malin Mohlin** - Added media: Akashiwo sanguinea_1.jpg

Check lists

Checklists | Nordic Microalgae - Mozilla Firefox

Arkiv Redigera Visa Historik Bokmärken Verkttyg Hjälp

<http://nordicmicroalgae.org/checklists>

Mest besökta Kom igång Senaste nytt Fel vid sidhämtning PlanktonDB Sprend

Checklists | Nordic Microalgae

Nordic Microalgae and aquatic protozoa LOG IN | REGISTER

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Checklists

Nordic Microalgae checklists (at present in a test version)

Lists of species and subordinate taxa and some additional information is available in the standard version. The extended version also includes the taxonomic hierarchy and HELCOM-PEG names etc. Please note that the content of Nordic Microalgae is based on *DynTaxa* at the [Swedish Species Information Centre](#).

Adobe Acrobat format

[nordicmicroalgae_checklist_2011_Oct_10.pdf](#)

Excel file format

[nordicmicroalgae_checklist_2011_Oct_10.xls](#)

[nordicmicroalgae_extended_checklist_2011_Oct_10.xls](#)

Text file (tab delimited)

[nordicmicroalgae_checklist_2011_Oct_10.txt](#)

[nordicmicroalgae_extended_checklist_2011_Oct_10.txt](#)

Biovolumes and Size-Classes of Phytoplankton in the Baltic Sea
 Olenina, I., Hajdu, S., Edler, L., Andersson, A., Wasmund, N., Busch, S., Göbel, J., Gromisz, S., Huseby, S., Huttunen, M., Jaanus, A., Kokkonen, P., Ledaine, I. and Niemkiewicz, E. 2006 Biovolumes and size-classes of phytoplankton in the Baltic Sea HELCOM Balt. Sea Environ. Proc. No. 106, 144pp. <http://www.helcom.fi/stc/files/Publications/Proceedings/bsep106.pdf>

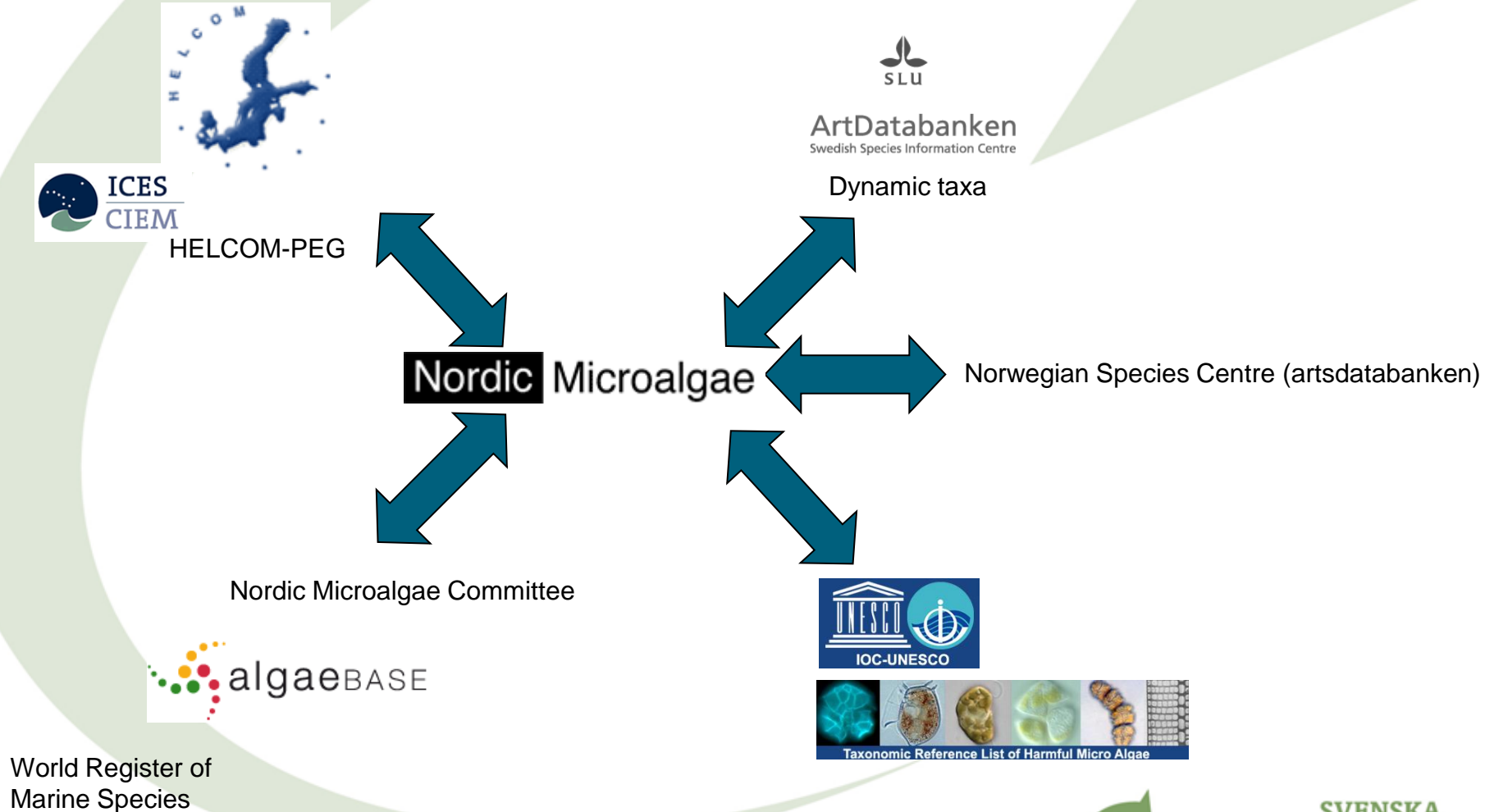
The latest update of the HELCOM-PEG list of biovolumes of phytoplankton in the Baltic Sea and the Kattegat-Skagerrak is available at ICES at: <http://www.ices.dk/env/repfor/index.asp>

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Klar

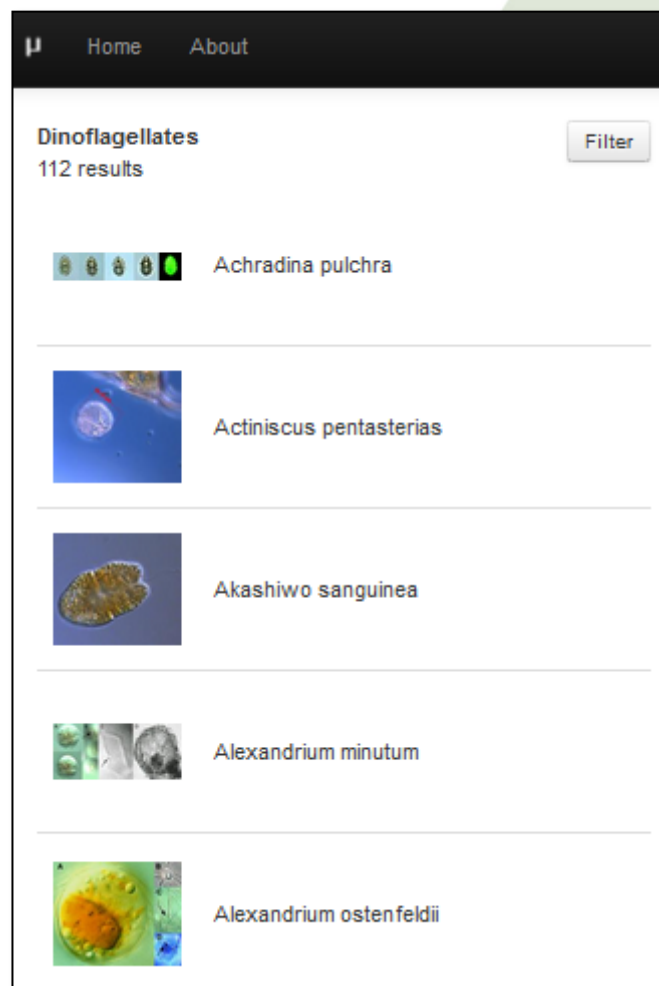
| nordicmicroalgae_checklist_2011_Oct_10.xls | | | | | | | | | |
|--|----------------------|-----------------------|---------|--------|---------|-----------|--|--|--|
| Class | Scientific name | Author | Rank | Trophy | KOC-NAB | Reference | | | |
| Phaeocystales | Phaeocystis | Van Leeuwen | Species | H | | 208342 | | | |
| | Phaeocystis communis | (Brady) Grunwaldt | Species | A | | 208343 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208344 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208345 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208346 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208347 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208348 | | | |
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| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208351 | | | |
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| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208363 | | | |
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| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208372 | | | |
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| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208374 | | | |
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| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208377 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208378 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208379 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208380 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208381 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208382 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208383 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208384 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208385 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208386 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208387 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208388 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208389 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208390 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208391 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208392 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208393 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208394 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208395 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208396 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208397 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208398 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208399 | | | |
| | Phaeocystis communis | (Grunwaldt) Grunwaldt | Species | H | | 208400 | | | |

Data flow plankton species information



m.nordicmicroalgae.org

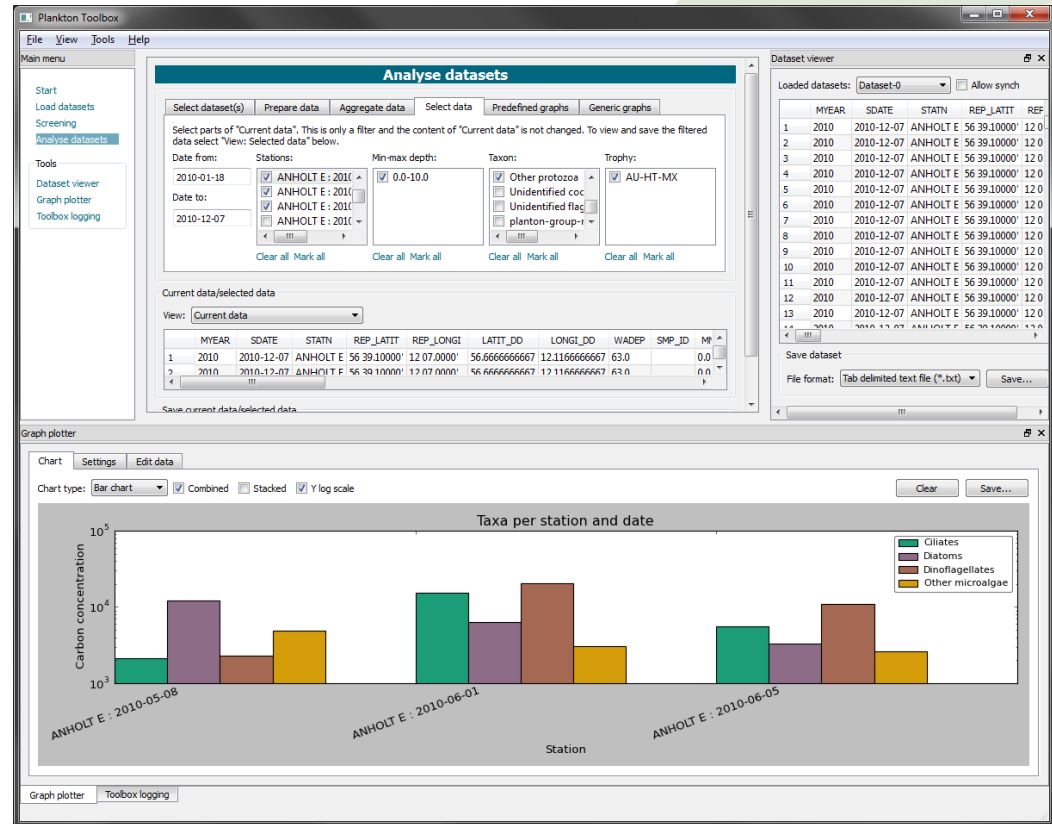
- Adapted for smartphones and tablets
- Tested on iPhone, iPad, Android
- Not an app – you need internet access
- Same content as www.nordicmicroalgae.org



Analysis tool - Plankton Toolbox

www.nordicmicroalgae.org/tools

- Tool for working with phyto- and zooplankton data
- Stand alone software developed in Python (open source)
- Available for Windows, Mac, Linux
- Version 1.0.0 released 19 May 2014
- Reads multiple data formats
- Screen data
- Filter data
- Aggregate data
- Plot data
- Statistical analysis
- Exports in txt and xlsx



About quantitative phytoplankton data

Information from one sample

- Biodiversity
 - Species
 - Genera
 - Unidentified organisms
- Cell shape and size
 - Size group
 - Geometric shape
 - Cell volume
 - Carbon content
- Trophic type
 - Autotrophic
 - Mixotrophic
 - Heterotrophic
 - Not specified
- Abundance (cell numbers)
- Biomass
 - Biovolume
 - Carbon

Meta data

Experiment

- Control
- Treatment
- Replicate

Field data

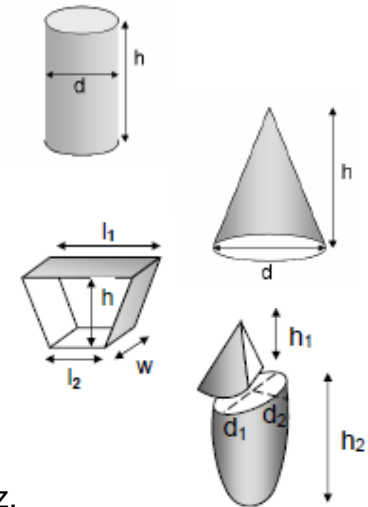
- Location
 - Latitude
 - Longitude
 - Depth or depth range
- Date and time
- Sampling method
 - Tube
 - Water bottle
 - Etc.

Analysis method

- Utermöhl – inverted microscope
- Other counting chambers
- Filtering – fluorescence microscopy etc.

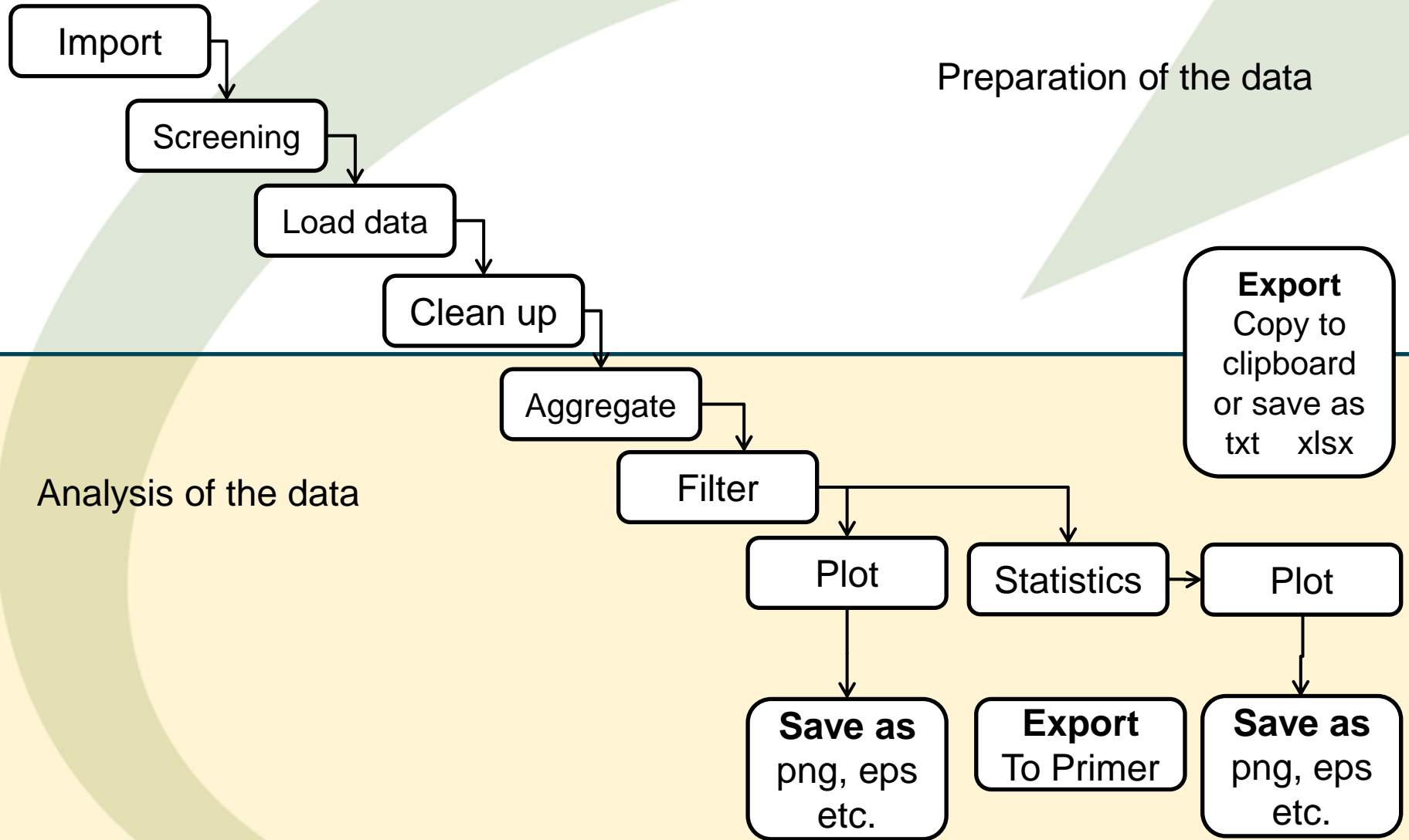
Phytoplankton analysis method

Utermöhl with calculation of biovolume



Olenina, I., Hajdu, S., Edler, L., Andersson, A., Wasmund, N., Busch, S., Göbel, J., Gromisz, S., Huseby, S., Huttunen, M., Jaanus, A., Kokkonen, P., Ledaine, I. and Niemkiewicz, E. [2006 Biovolumes and size-classes of phytoplankton in the Baltic Sea HELCOM Balt.Sea Environ. Proc. No. 106, 144pp. \(PDF\)](#)

Stepwise analysis of data using Plankton Toolbox



Some info needed

Microscopy

- Names of organisms
- Taxonomic hierachy
- Trophic types
- Cell volumes
- Carbon content

Molecular data

- Operational Taxonomic Units
- Taxonomic hierachy
- Trophic types
- Ratio rDNA/Cell size
- Ratio cell size/carbon content

Plankton Toolbox

SMHI

The screenshot displays the Plankton Toolbox software interface. The main window is titled "Analyze data" and contains a menu bar (File, View, Tools, Help) and a main menu on the left with options like Introduction, Import datasets, Screening, and Analyze data. The central area shows a list of datasets with "Dataset-1" selected. Below this is a table of analysis data with columns for Year, Sampling date, Station name, and coordinates. The table contains 9 rows of data for the year 2012. To the right, a "Toolbox logging" window shows a list of system messages and warnings, including species missing warnings and dataset import logs. The Windows taskbar at the bottom shows the system clock at 13:58 on 2013-10-14.

Analyze data

Select dataset(s)

Select dataset(s) to be analyzed. Note that "Analysis data" contains a working copy of one or several loaded datasets. Rows in "Analysis data" can be removed, added or aggregated during the analysis.

Dataset-1. Source: PP_NI4_Falkenberg_2007_2012.txt

Analysis data, filtered data, statistical data and export data

View:

| | Year | Sampling date | Station name | Visit latitude (degrees+decimal minute) | Visit longitude (deg+decimal minute) | Latitude (decimal degree) |
|---|------|---------------|----------------|---|--------------------------------------|---------------------------|
| 1 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 2 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 3 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 4 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 5 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 6 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 7 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 8 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |
| 9 | 2012 | 2012-12-20 | N14 Falkenberg | 56 56.4000' | 12 12.7020' | 56.94 |

Export data File format:

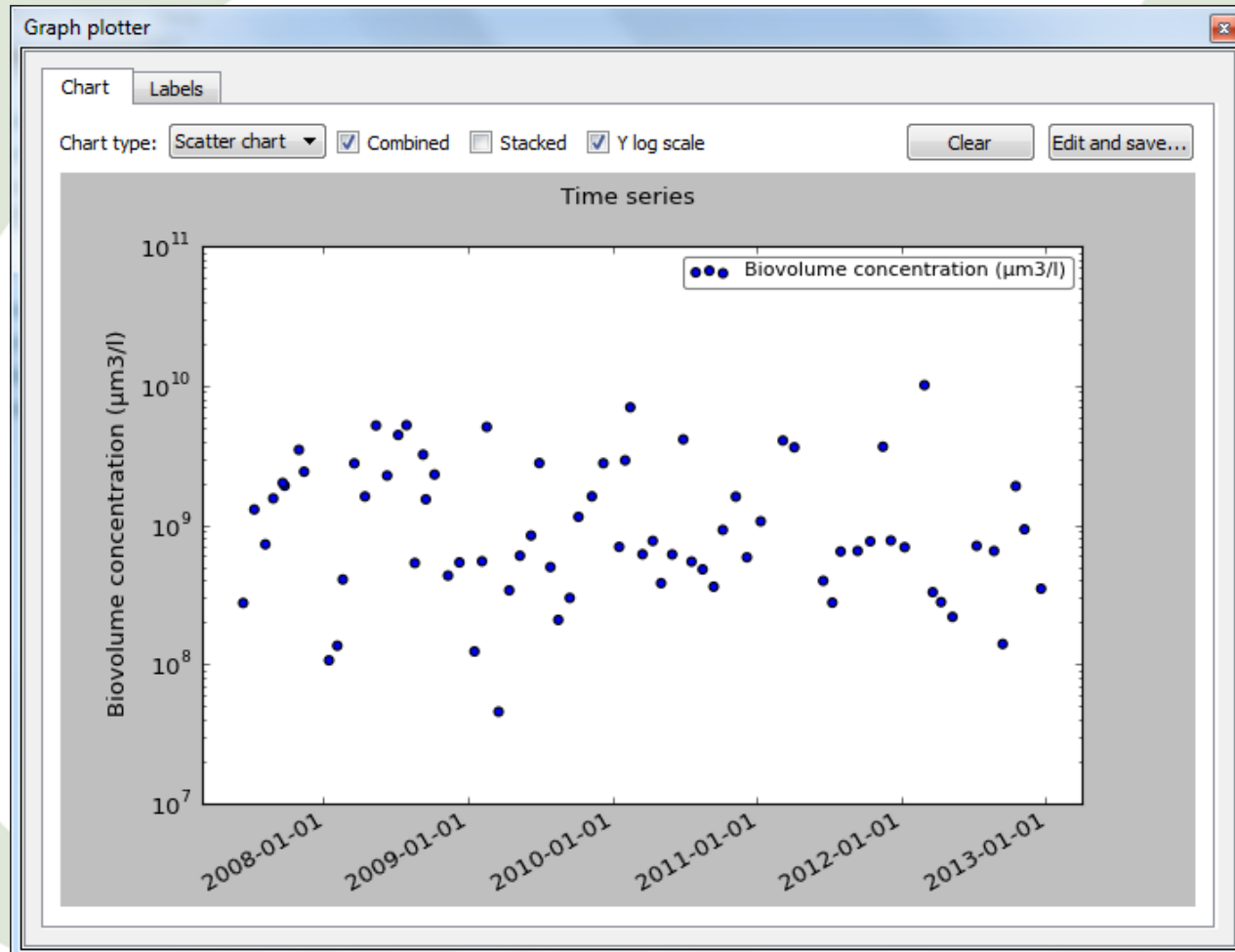
Toolbox logging

Row limit: 1000

```
2013-10-14 13:50:42: - sharkweb_zooplankton_parser.xlsx
2013-10-14 13:50:43: Loading species lists (located in 't
2013-10-14 13:50:43: - nordicmicroalgae_species.xlsx (t
2013-10-14 13:50:44: - smhi_species.xlsx (taxa)
2013-10-14 13:50:44: - translate_to_nordicmicroalgae_s
2013-10-14 13:50:44: WARNING: : Species missing: Aph
2013-10-14 13:50:44: WARNING: : Species missing: Cha
2013-10-14 13:50:44: WARNING: : Species missing: Kata
2013-10-14 13:50:44: WARNING: : Species missing: Mes
2013-10-14 13:50:44: WARNING: : Species missing: Mic
2013-10-14 13:50:44: WARNING: : Species missing: Nav
2013-10-14 13:50:44: WARNING: : Species missing: Nav
2013-10-14 13:50:44: WARNING: : Species missing: Pedi
2013-10-14 13:50:44: WARNING: : Species missing: Pror
2013-10-14 13:50:44: WARNING: : Species missing: Rho
2013-10-14 13:50:44: WARNING: : Species missing: Schi
2013-10-14 13:50:44: WARNING: : Species missing: Sele
2013-10-14 13:50:44: WARNING: : Species missing: Spat
2013-10-14 13:50:44: WARNING: : Species missing: Stat
2013-10-14 13:50:44: WARNING: : Species missing: Stat
2013-10-14 13:50:44: WARNING: : Species missing: Syn
2013-10-14 13:50:44: WARNING: : Species missing: Syn
2013-10-14 13:50:44: WARNING: : Species missing: Cho
2013-10-14 13:50:44: - smhi_harmful.xlsx (harmful)
2013-10-14 13:50:45: - peg_bvol_2011.xlsx (BVOL)
2013-10-14 13:50:47: - smhi_bvol_2011.xlsx (BVOL)
2013-10-14 13:57:31: Selected parser: sharkweb_phytop
2013-10-14 13:57:33: Importing datasets...
2013-10-14 13:57:48: Accumulated log summary:
2013-10-14 13:57:48: - INFO: Loading file. Header cont
2013-10-14 13:57:48: - Errors: 0.
2013-10-14 13:57:48: - Warnings: 0.
2013-10-14 13:57:48: Importing datasets done. Numbe
```

Plankton Toolbox

Plot of aggregated data



Statistics

Plankton Toolbox

File View Tools Help

Main menu

- Introduction
- Import datasets
- Screening
- Analyze data

Tools

- Dataset viewer
- Graph plotter
- Toolbox logging
- Development and test

Analyze data

Select dataset(s) Clean up Aggregate/complement data Filter Predefined graphs Generic graphs **Statistics** Exports

Note: Help text is missing.

Parameter:

Split by:

- Year
- Season
- Month
- Station
- Sampling event
- Depth
- Taxon

Analysis data, filtered data, statistical data and export data

View:

| | Parameter | Year | Mean | Median | Std. dev. | Min | Max | Counted values |
|---|---------------------------------|------|---------------|--------------|---------------|-------------|--------------|----------------|
| 1 | Biovolume concentration (µm3/l) | 2007 | 1702747608.5 | 1730492117.0 | 928585735.51 | 275619109.0 | 3458372184.0 | 8 |
| 2 | Biovolume concentration (µm3/l) | 2008 | 2038217875.8 | 1600355808.0 | 1730441762.19 | 106979274.0 | 5192805282.0 | 15 |
| 3 | Biovolume concentration (µm3/l) | 2009 | 1203179603.21 | 575252546.0 | 1371046751.99 | 45800507.0 | 5042117572.0 | 14 |
| 4 | Biovolume concentration (µm3/l) | 2010 | 1539925545.57 | 656494358.5 | 1835884532.01 | 360753324.0 | 6979336337.0 | 14 |
| 5 | Biovolume concentration (µm3/l) | 2011 | 1584407592.1 | 768342850.5 | 1440836668.19 | 277289709.0 | 4031355485.0 | 10 |

Export data

File format:

Imported datasets: 1

Summary

- Data from marine monitoring and surveys
 - Biology
 - Physics and chemistry
- Machine to machine communication
- Information system for microalgae
 - Quantitative information on biodiversity, distribution, abundance, biomass
 - Information on size, trophic type, harmfulness etc.
 - Analysis tool Plankton Toolbox
- Quality control needed at every step in work flows
- Communication with the original data provider is essential

