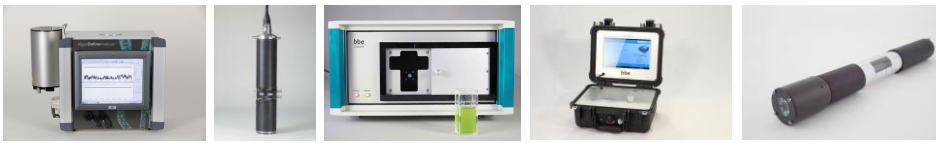
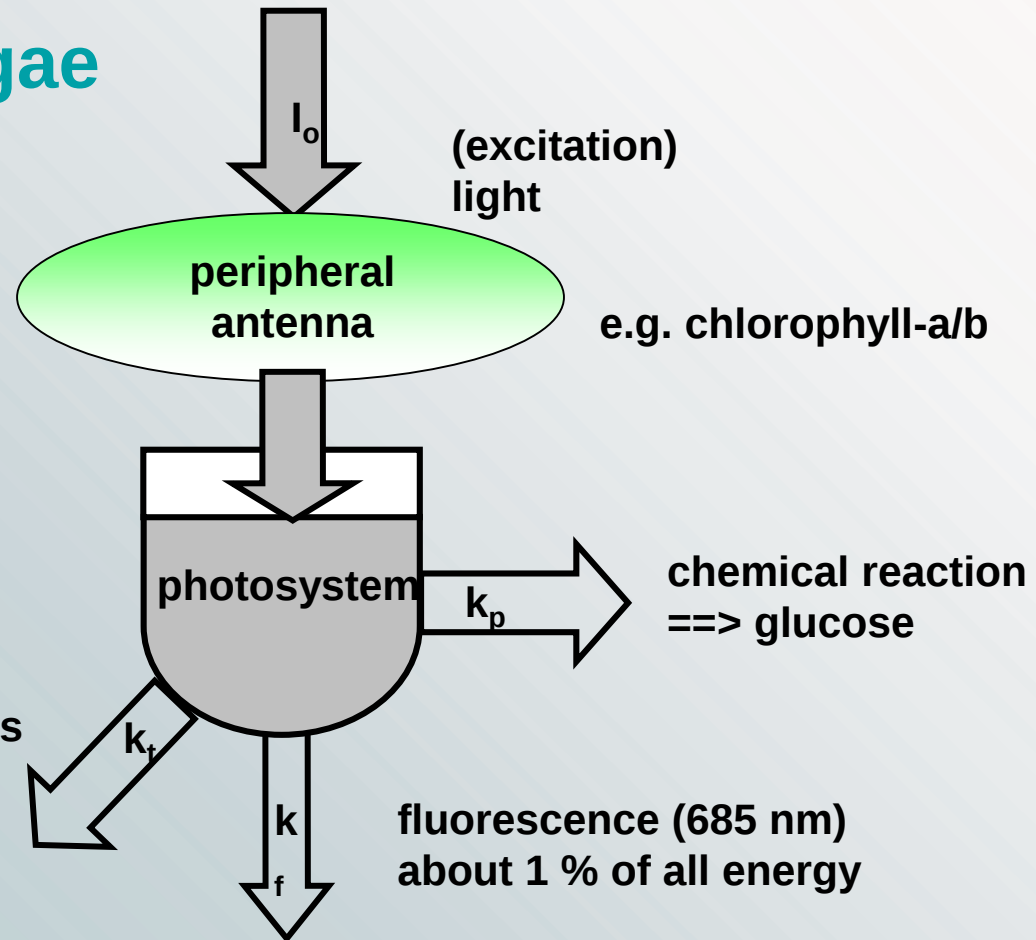
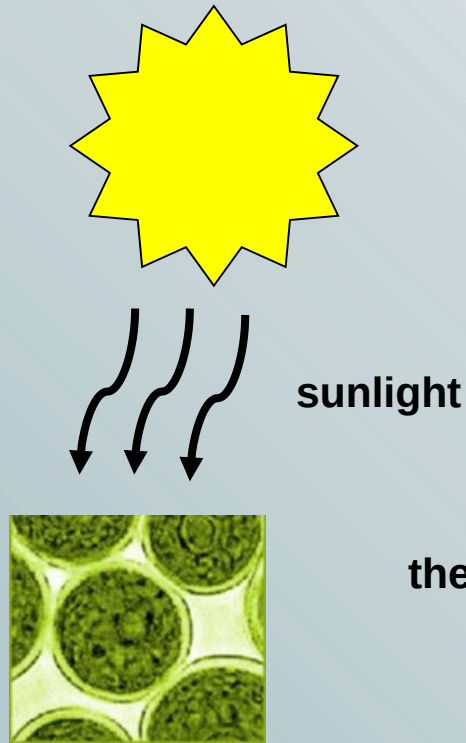


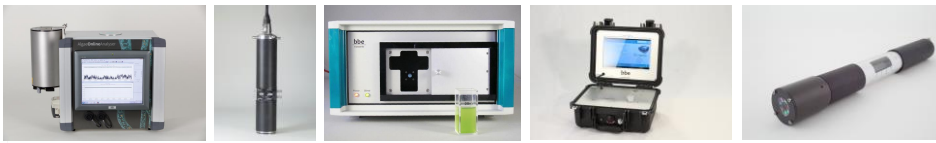
Advanced Phytoplankton Monitoring in Ocean Research

Tobias Boehme

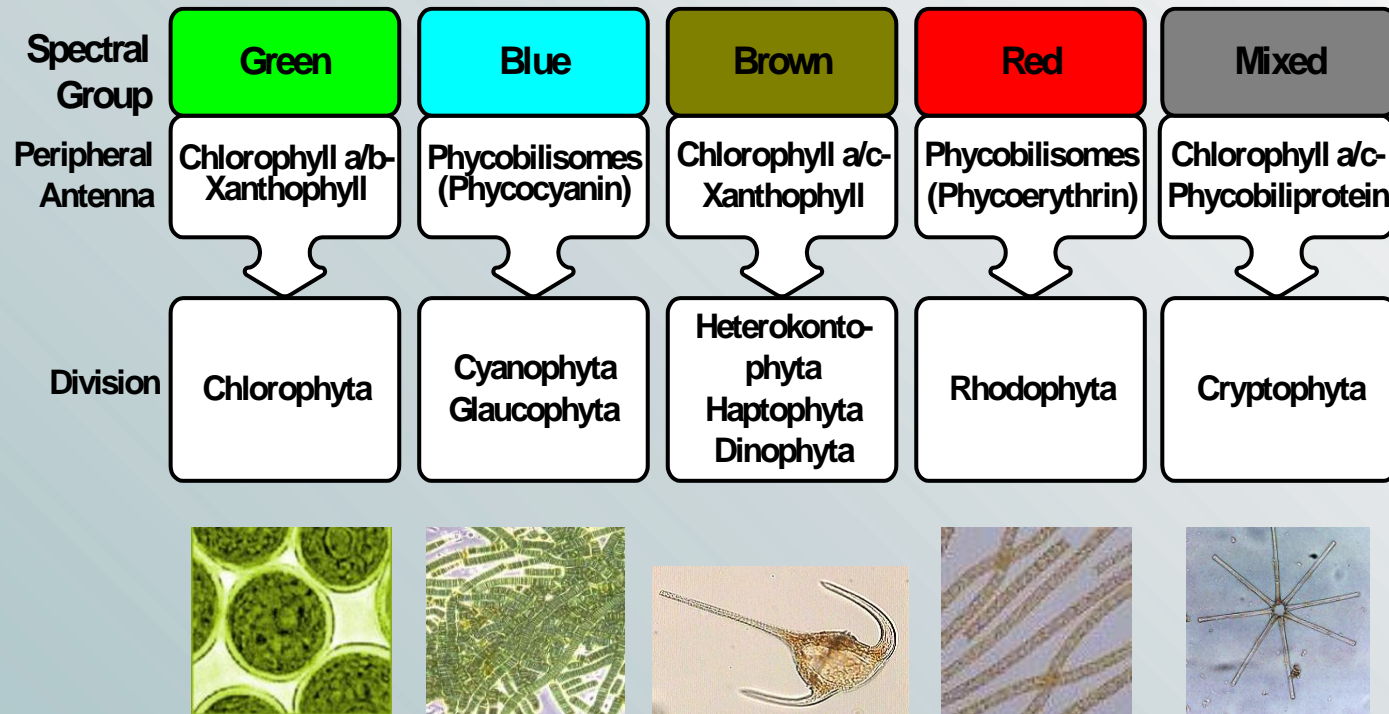


Photosynthesis of algae

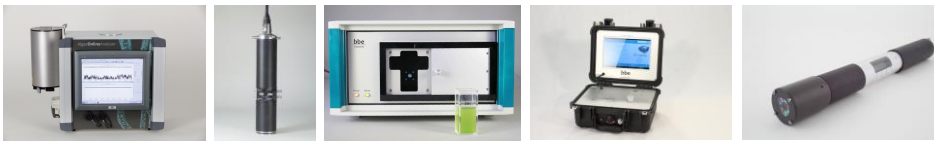




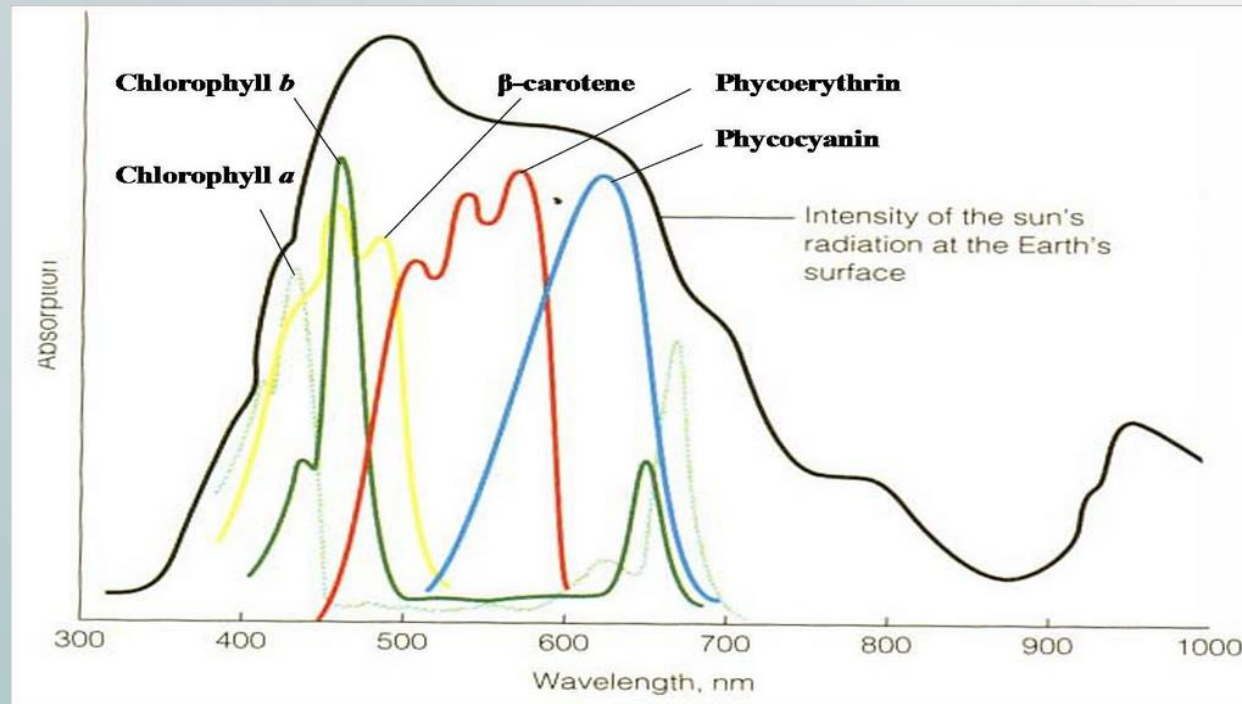
Spectral groups of phytoplankton

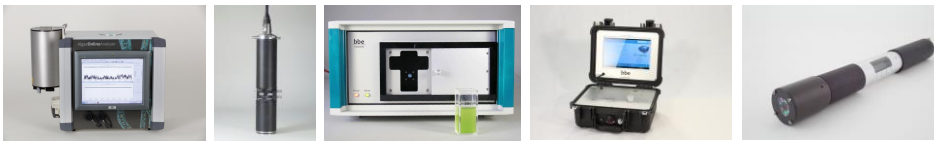


Algal pigments and their relation to taxomical algae classes

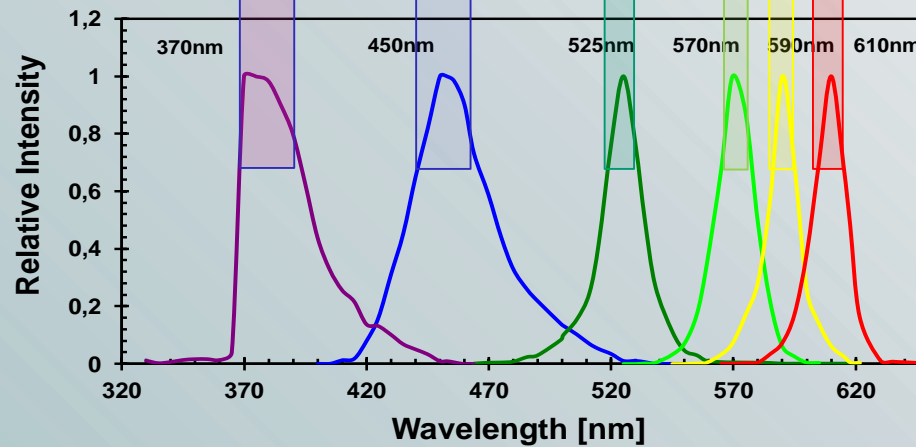
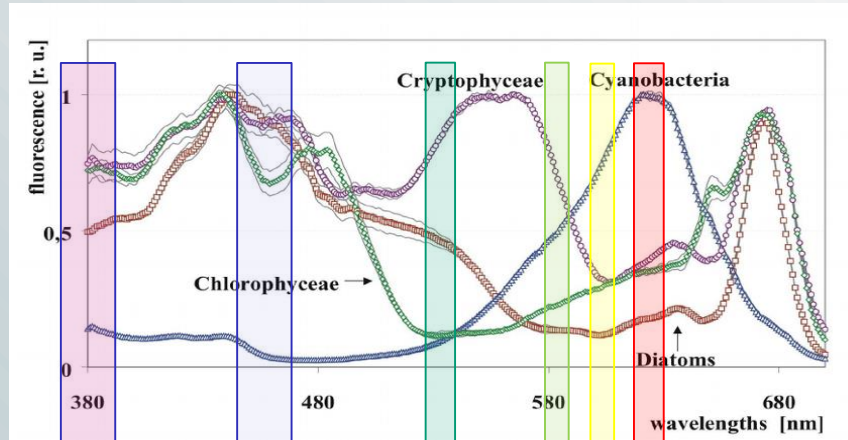


Sun spectra and absorption spectra of the different pigments

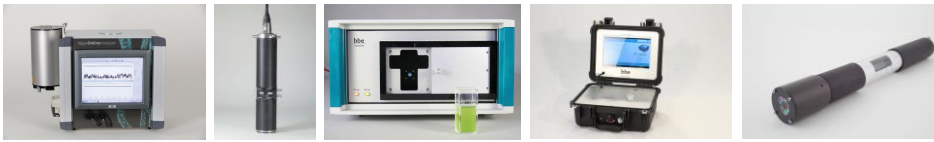




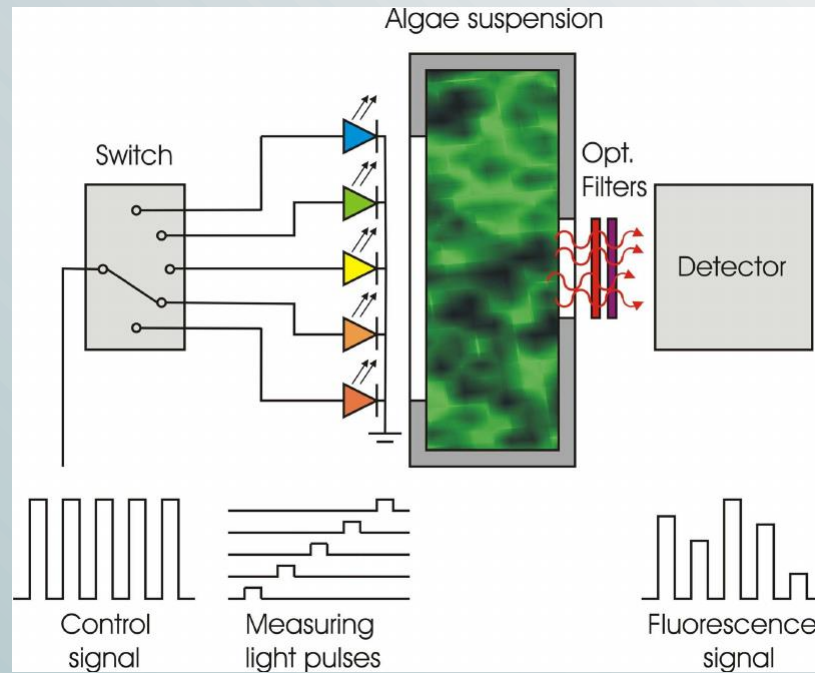
Excitation spectrum, fluorescence measured at 700 nm

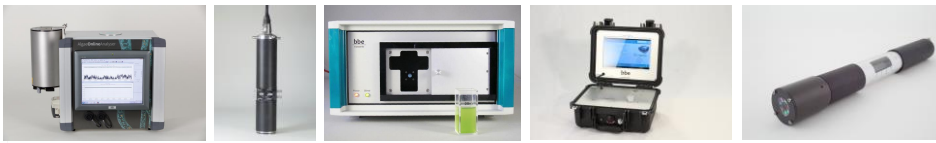


Spectra of the LEDs, used in the bbe instruments

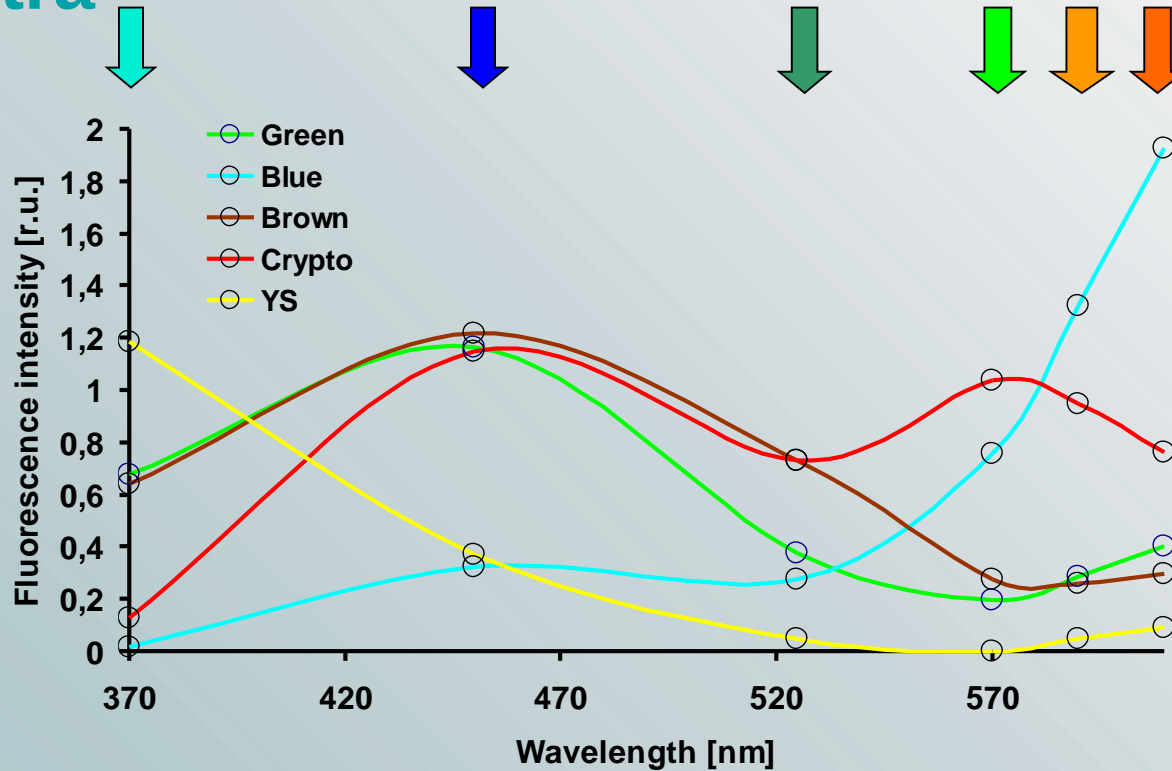


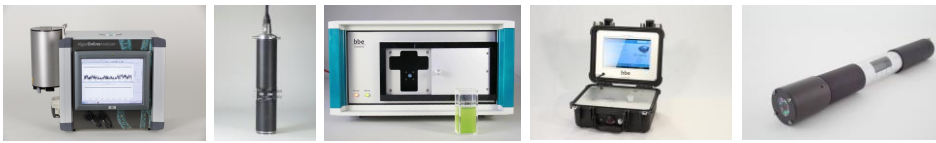
Principle of the measurement





Principle of the fingerprint with norm spectra



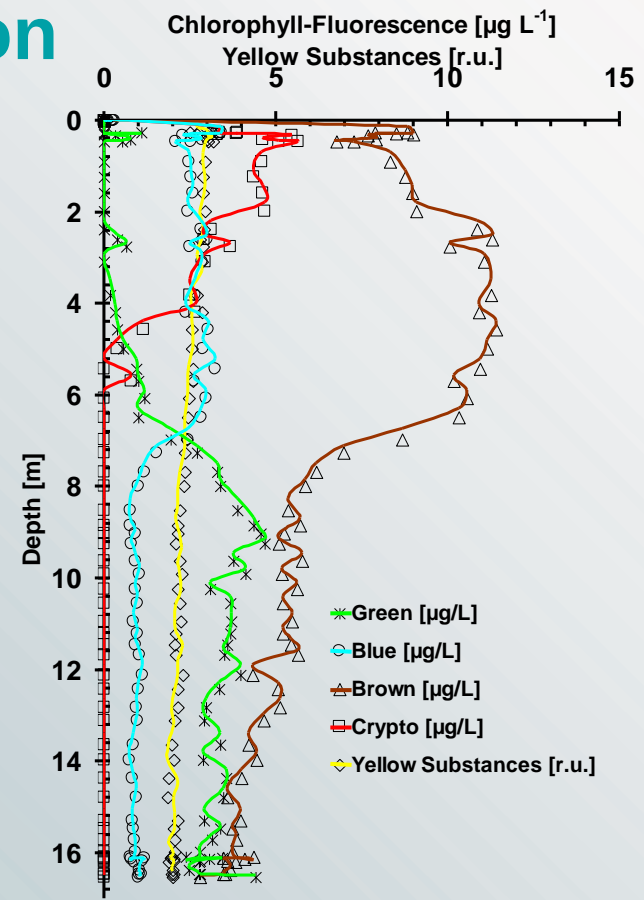
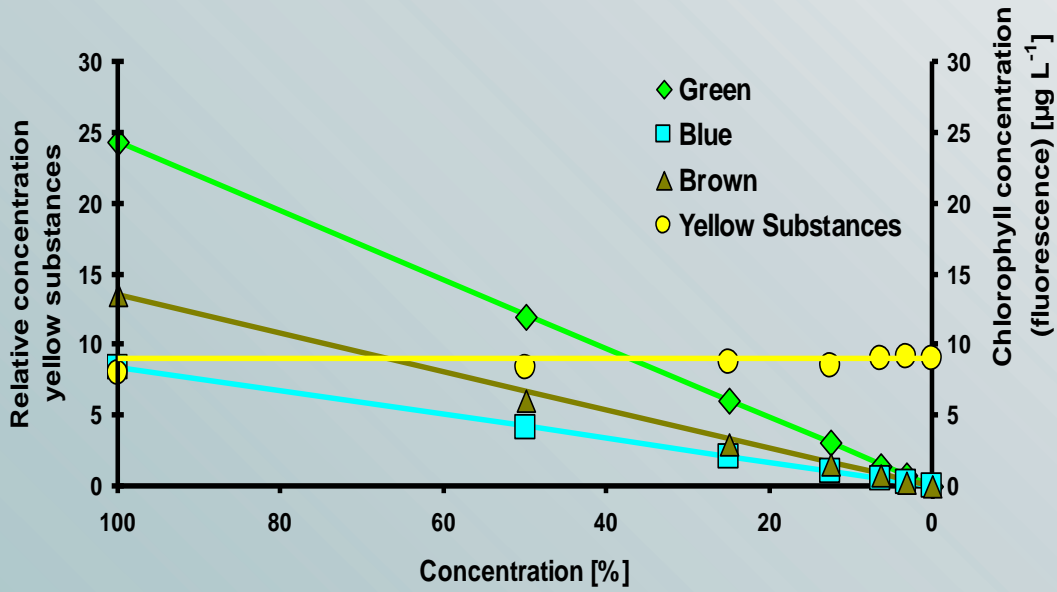


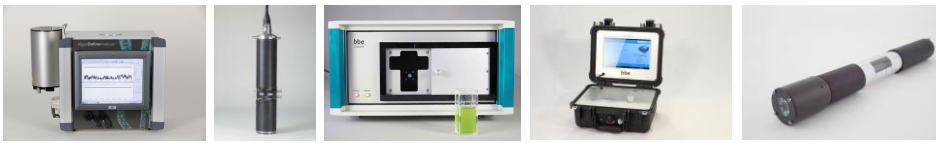
Calibration with real algae



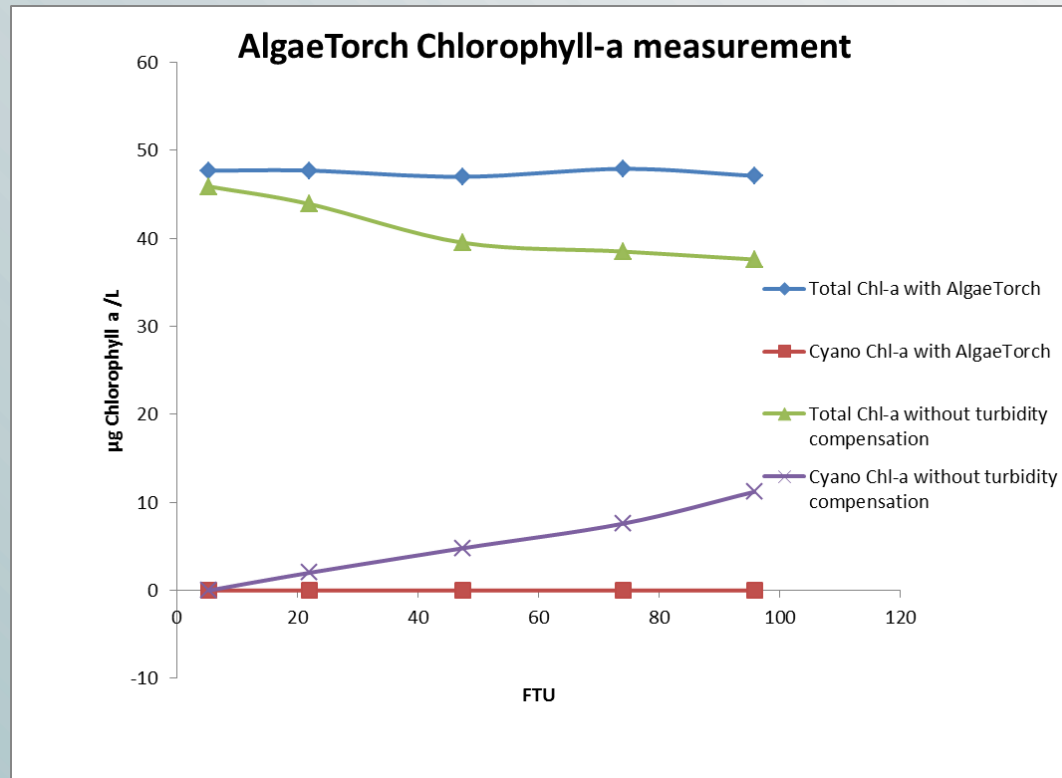


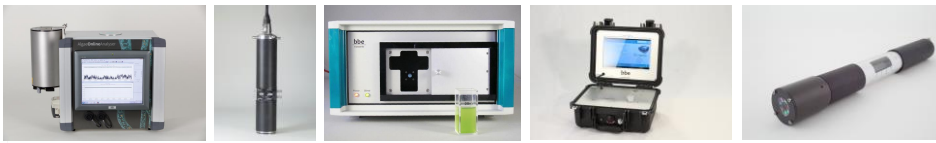
Yellow substances correction



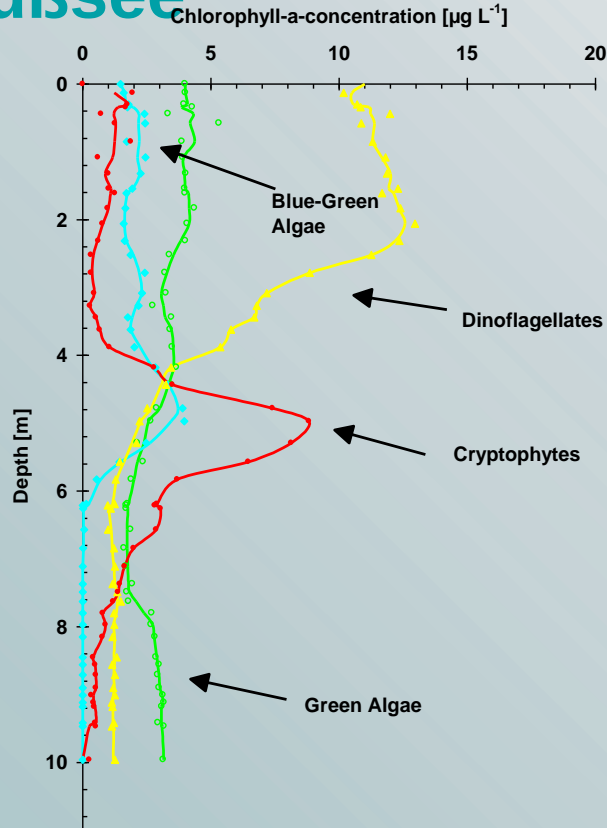


Turbidity correction

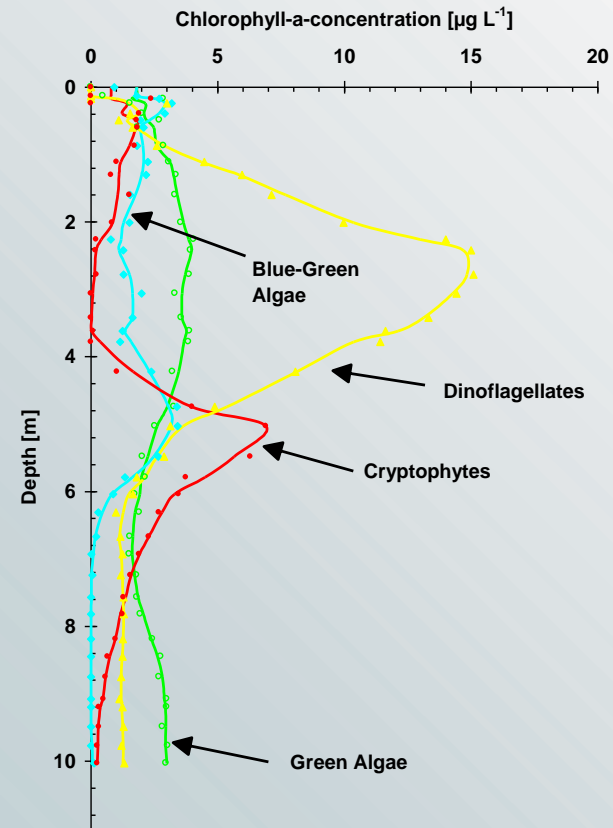




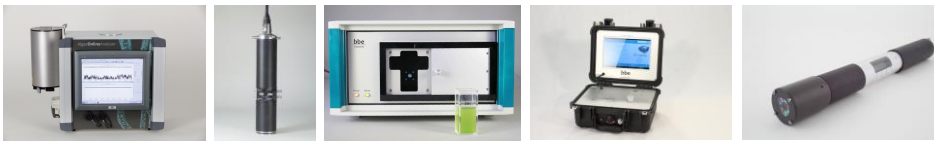
Migration of Dinoflagellates in Eutrophic Plußsee



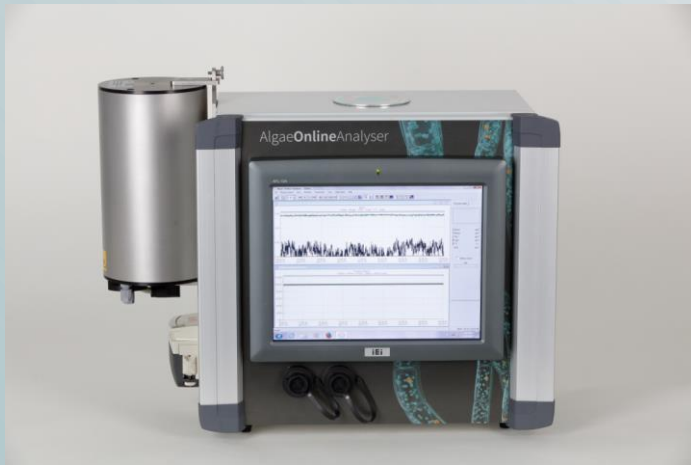
9:30 am



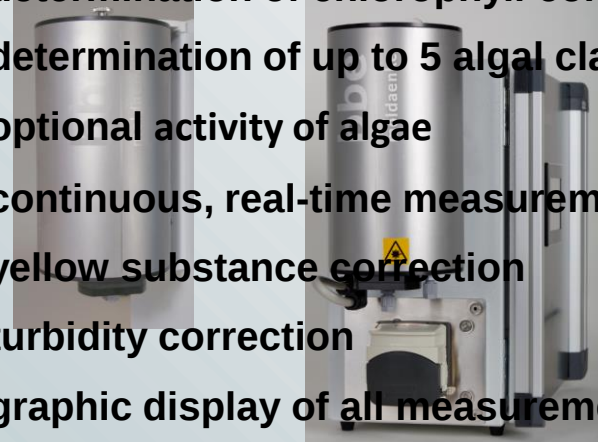
2:00 pm



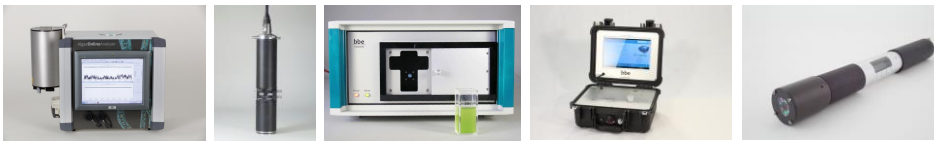
bbe Algae Online Analyser



- **determination of chlorophyll concentration**
- **determination of up to 5 algal classes**
- **optional activity of algae**
- **continuous, real-time measurement**
- **yellow substance correction**
- **turbidity correction**
- **graphic display of all measurement values**



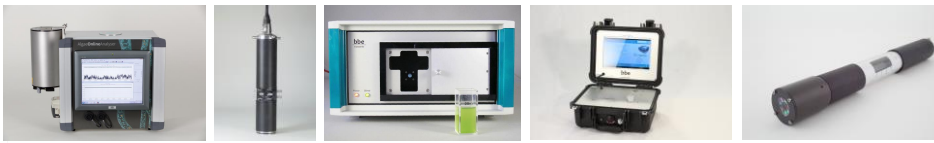
Used for Ferrybox applications



Algae Online Analyser applications



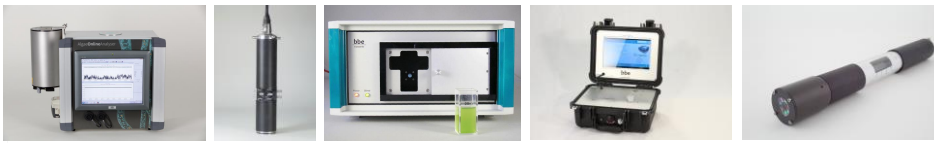
HZG Container at the river Elbe



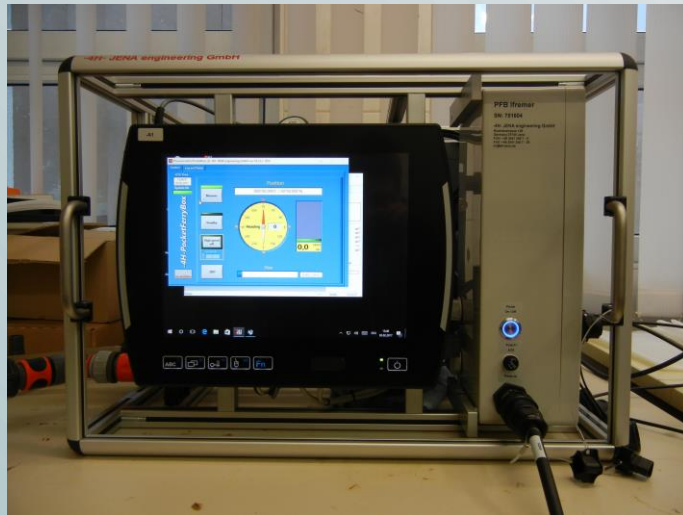
bbe Algae Online Analyser applications



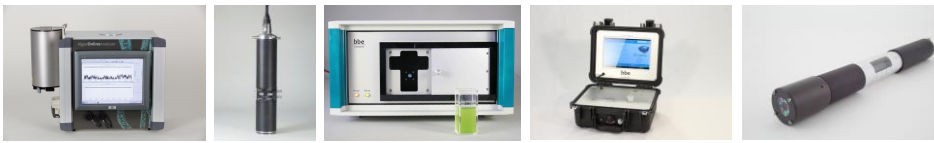
-4H- Ferrybox on the research vessel Thalassa (Ifremer)



Algae Online Analyser applications



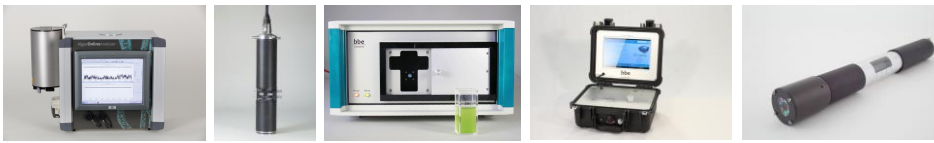
-4H- PocketFerrybox Ifremer Boulogne-sur-Mer



Algae Online Analyser applications

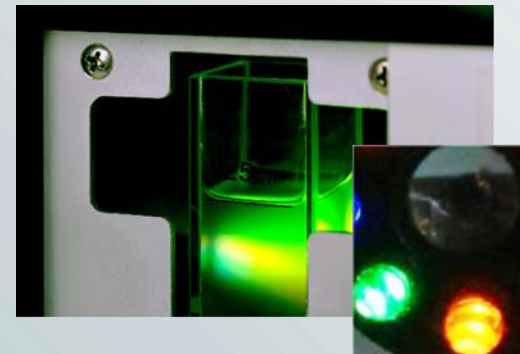


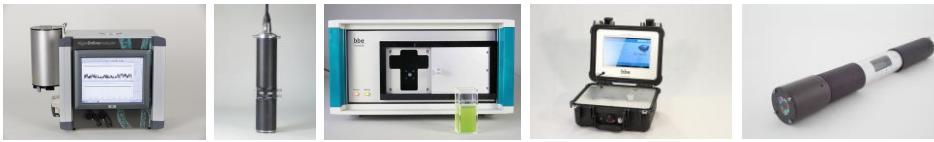
-4H- FerryBox at the RV Burchana (NLWKN)



Algae Lab Analyser

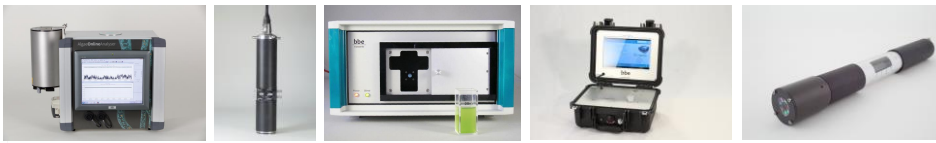
- chlorophyll determination
- algae class differentiation
- activity of algae
- measuring range: 0-200 $\mu\text{g/l}$
- 12V battery connection





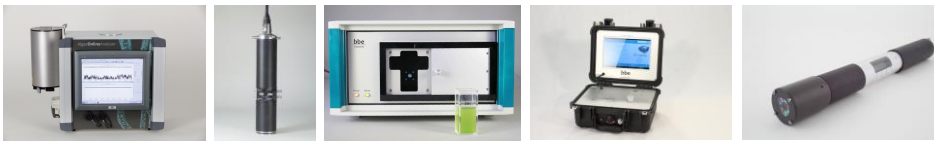
FluoroProbe





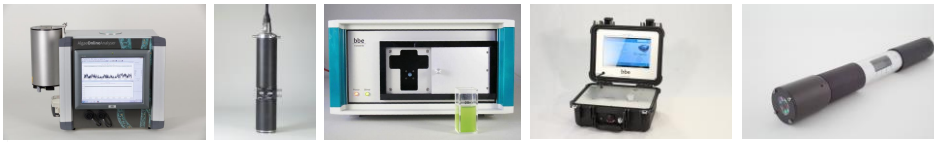
FluoroProbe applications



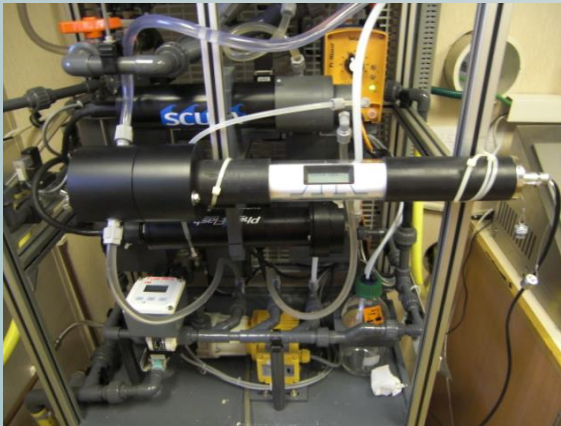


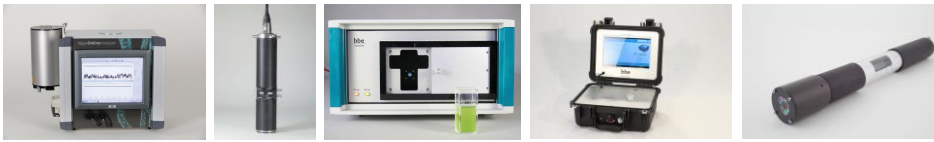
PhycoSens measuring of toxic component





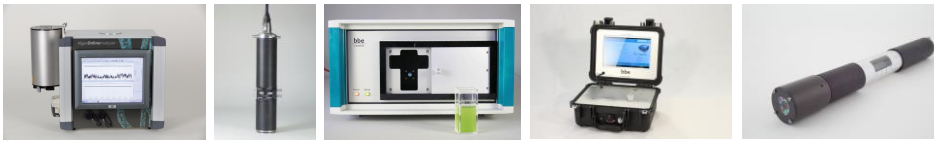
Algae- and BenthosTorch





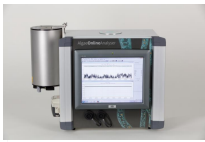
10 cells for Ballast water monitoring





bbe Toximeter





Thank you!