Research: Learning by Doing

Which exchange processes occur between groundwater and seawater on the beach? This was one of the major questions addressed in the Wadden Sea World Heritage Summer School 2018 held by the Institute for Chemistry and Biology of the Marine Environment (ICBM), the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the Royal Netherlands Institute for Sea Research (NIOZ). In the course, fourteen international Master's and PhD students learned about pore water analysis, a method for investigating the biological and chemical characteristics of sediments.

1 Under the guidance of marine physicist Prof. Dr. Oliver Zielinski the students gather samples of the pore water that has accumulated in the tiny spaces in the ground on the northern beach of Spiekeroog island. Along two transects – lines that run vertically from the high tide line to the dunes – they plot out thirteen measuring points with spaces of five and ten metres between them.

2 In order to reach the water, so-called pore water lances are inserted into the ground at each measuring point to a depth of one metre and two metres. The bottom end of the lance has small slits through which the water can flow.

3 A syringe is used to create pressure, forcing the water up through the lance and into the flask.

4 To make sure that the measurements are accurately assigned to the various locations later on, the points are mapped to within a few centimetres using GPS.

5 At each measuring point pore water samples are taken for analysis in the lab later on. A filter is used to sift out any particles larger than 0.2 micrometres so that only dissolved organic matter, or DOM, is left in the water.

6/7/8 The students measure temperature, conductivity, oxygen and iron content, and the amount of dissolved organic matter on site. At the first measuring points they carefully observe every step of the procedure, familiarising themselves with the methods. Later on each of them concentrates on one particular step. Learning to work as a team and developing a routine is vital for field measurement campaigns, Oliver Zielinski explains.

9 Patience and rigour are key to achieving good, accurate results in the field. To make measurements of DOM using UV light, for example, containers must be completely free of fingerprints, dust particles and water.

10 At the end of the project the students prepare a presentation. Some members of the group perform statistical analyses of the data; others work on the methodological background. Summing up their experiences in the project, participants note that the interaction with other young researchers from different disciplines is particularly valuable.