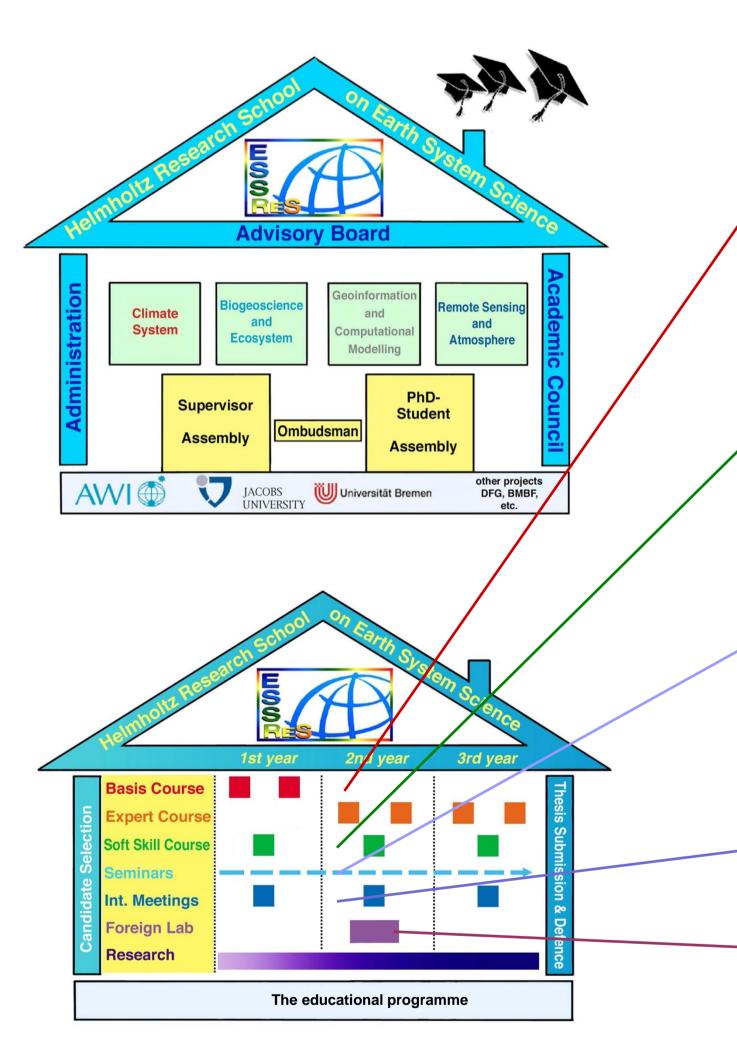


ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FÜR POLAR-UND MEERESFORSCHUNG

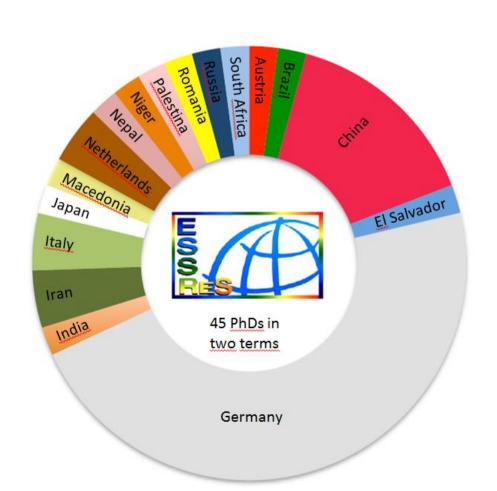
Post-graduate education in Germany has changed a lot over the past decades. Formerly, PhD students generally did not have the option to attend formal classes and lectures and were expected to conduct their independent research, including occasionally teaching courses for students. Since the introduction of bachelor and masters studies with the Bologna Process in the late 90th, the higher education in Europe has been harmonized, leading to more structured and focused studies at the expense of a broad and universal disciplinary education. At this same time, special fields such as Earth System Science became more interdisciplinary. In consequence, universities and research institutes have established so-called research schools and/or graduate schools, offering specific courses and training alongside the doctorate.



The structural and educational concept

Recruitment

Online application process for 12 (9) PhD stipend position during two successive periods of three years each, following the educational programme as a cohort. The classes were filled with applicants of the collaborating institutions to reach maximum size of 22-24 PhDs.



ESSReS II L1-L9:

ecturers

skills

coaching

ESSReS II S1-S6:

Monthly seminars

ESSReS II R1-R3:

"Students teach students"

PhDs, supervisors, peers

Conference funding:

> 40 proposal funded

4 research stays in Italy,

Copenhagen, Toronto, Paris

ESSReS-FL:

Annual retreats "PhD conference"

ESSReS II SST1-SST4:

30 days of basic and expert

courses with more than 45

Invited 4 international lecturer/

Research skills development

Career and leadership training

Scientific writing and individual

guest scientists for 1 week until 3

Presentation and Communication

International ESSReS PhD classes -SSReS-I: 9 nationalities ESSReS-II: 12 nationalities



Earth System Science – Bridging the gaps between disciplines; Perspectives from a multi-disciplinary Helmholtz Research School H. Meggers, K. Grosfeld, G. Lohmann, A. Bracher, D. Wolf-Gladrow, V. Unnithan, M. Buschmann,

A.Ladstätter-Weißenmayer, J. Notholt

The joint ESSReS- team: Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany; Institute for Environmental Physics, University of Bremen, Germany; Jacobs University Bremen, Germany.

Earth System Science Research School (ESSReS)



ESSReS is an international and interdisciplinary research school for 23 PhD students at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) and their partner universities: University of Bremen and Jacobs University Bremen. ESSReS combines observations, modelling, and data analysis in order to decipher the Earth's complex climate system. Structured training and supervision support interdisciplinary research at an early stage of the scientific career.

The educational program

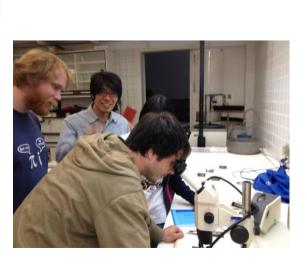
Introductory lectures by senior scientists from the participating institutes (topics from Remote Sensing to the Living Ocean). Two cruises with research vessels (RC Uthörn, RV Heincke) were offered.



Expert courses were designed to give a more detailed insight into the research fields of the participating institutes. The content is focused on "Remote Sensing of the Atmosphere and Cryosphere", "Paleoclimate: From proxies to climate data" and "Bioarchives, a source of climate reconstructions"



Seminar series strengthened the social network of the group, but also enabled scientific exchange and student-to-student learning. Usually, up to three presentations per event were given by the students, fostering motivation and the bottom-up approach, team building effects and conflict management.





Computational skills courses were offered to teach several computational skills needed for a productive work flow.

Transferable skill courses were offered in cooperation with the Imperial College London. Three course from "Research skills development" via "Presentation and communication skills" to "Career and leadership" were offered.









Excursions Various excursions within ESSReS were offered to the PhD students as on-site training, practical application and social event.

Highest and lowest part of Northern Germany



Annual retreat in autumn of each year to ensure a regular exchange between the PhD students and the supervisors/senior scientists of the three institutions.



POLARSTERN

Supervision concept

- Regular PhD committee meetings
- PhD proposal after 6 month
- Progress Assessment Form
- Conference attendance, presentations
- Research stay abroad
- Clearly structured research and education plan

Was ESSReS successful?

First cohort (22 PhDs):

- ✓ 17 finished, mean duration 3y 11m (3 years to 5.5 years)
- ✓ Career: 10 Science (PostDoc, Assistant Professor), 3 Industry, 1 Teacher, 3 unknown
- ✓ 1 changed topic after 18 month, left ESSReS
- ? 4 of 22 PhDs did not finish their PhD (18%), two of them still working on it
- Including 2.5 month PhD programme

Second cohort (23 PhDs) in the completing phase:

- \checkmark 5 finished, mean duration 3y 3m (3.1 years to 3.5 years) ✓ Career: 5 Science (PostDoc)
- ✓ 1 changed topic after 2 years to become a teacher
- ? 1 of 23 PhDs did not finish, changed topic
- Including 2.5 month PhD programme





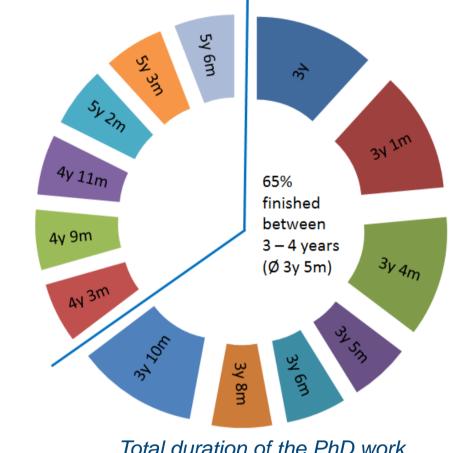
Institute of **Environmental Physics** University Bremen



Jacobs University Bremen

Support

- Provides competitive grants for
- conference attendance
- collaborative research with international partners
- \succ Personal training, coaching, child care, etc.



Total duration of the PhD work of the first ESSReS class



PhDs of the second class receive their Helmholtz Certificates

