Universität Rostock Traditio et Innovatio

1st International Winter School on "Analysis of Climate Variability"

22 – 29 March 2019

co-organized by
Leibniz Institute for Baltic Sea Research Warnemünde (IOW), the University of Rostock and the International Baltic Earth Secretariat at Helmholtz-Zentrum Geesthacht under the umbrella of Baltic Earth (www.baltic.earth)

Course agenda (arrival in Warnemünde 15:30 on Friday, departure 13:00 on Friday):

Day	Friday 22/3	Saturday 23/3	Sunday 24/3	Monday 25/3	Tuesday 26/3	Wednesday 27/3	Thursday 28/3	Friday 29/3
General topic	Course introduction, student presentations	Baltic Sea dynamics and statistical methods I	Proxy data and statistical methods II	Statistical methods III/IV and paleo climate modeling	Statistical methods and paleo climate modeling	Statistical analysis	Statistical analysis	Examination, students' group presentation, resumé
Breakfast JH 08:00-08:45								
Speaker/title Morning session 09:00-10:30 (2 x 45 min)	Travel to Warnemünde	Short student presentations of their thesis work (5 min. each)	Jerome Kaiser: Paleo-environmental reconstructions of the Baltic Sea I	Markus Meier: Introduction into statistical methods III	Sebastian Wagner: Paleoclimate modeling – current activities	Claudia Frauen: Empirical Orthogonal Functions (EOFs)	Hagen Radtke: Statistical analysis of inhomogeneous time series I	Examination (90 minutes)
Break 10:30-11:00								
11:00-12:30 (2 x 45 min)	Travel to Warnemünde	Short student presentations of their thesis work (5 min. each)	Jerome Kaiser: Paleo-environmental reconstructions of the Baltic Sea II	Markus Meier: Introduction into statistical methods IV	Markus Meier: Introduction into statistical methods V	Claudia Frauen: Applications of EOFs	Hagen Radtke: Statistical analysis of inhomogeneous time series II	Markus Meier: Resumé of the school
Lunch IOW 12:30-13:30								
Speaker/title Afternoon session: 13:30-15:00 (2 x 45 min)	Travel to Warnemünde	Marcus Reckermann: Introduction into the Baltic Sea ecosystem	Markus Meier: Introduction into statistical methods II	Madline Kniebusch and Florian Börgel: Introduction into R	IOW exhibition (Michael Naumann)	Madline Kniebusch and Florian Börgel: Exercises with R	Students' group presentations (10+10 min)	Departure
Break 15:00-15:30								
15:30-17:00 (2 x 45 min)	Markus Meier: Course introduction, Florian Börgel: Introduction into jupyter notebook for programming	Markus Meier: Introduction into statistical methods I	Outdoor activities (beach walking tour)	Sebastian Wagner: Paleoclimate modeling – basic introduction	Madline Kniebusch and Florian Börgel: Introduction into R	Madline Kniebusch and Florian Börgel: Power spectrum, Wavelets, Spatial Filter	Students' group presentations (10+10 min)	
Break 17:00-18:00								
Dinner JH 18:00-19:30								
Evening session 19:30-21:00 (2 x 45 min)	Social activities (ice breaker at IOW)	Social activities (gathering at IOW)	Students' group work and exercises supervised by Markus Meier	Students' group work and exercises supervised by Markus Meier	Students' group work and exercises supervised by Markus Meier	Students' group work and exercises supervised by Markus Meier	Students' group work and exercises supervised by Markus Meier	

Lectures	Hours	Contents
Prof. Dr. Markus Meier	10	Introduction into statistical methods: 1) probability, probability density and distribution, 2) covariance matrix, 3) estimation of statistical parameters, 4) time series analysis – basic definitions, 5) stochastic climate models, 6) auto-covariance function, 7) spectrum, 8) cross-covariance function, 9) uncertainties in statistical analysis, 10) test of hypothesis
Dr. Claudia Frauen	4	Statistical analysis methods: EOFs
Dr. Hagen Radtke	4	Statistical analysis methods of inhomogeneous time series
Dr. Jerome Kaiser	4	Reconstruction of the history of the Baltic Sea and climate proxy data
Dr. Marcus Reckermann	2	Introduction into the Baltic Sea ecosystem dynamics
Dr. Sebastian Wagner	4	Paleoclimate Modelling Intercomparison Project (PMIP)
Total	28	

Seminar	Hours	Contents
Prof. Dr. Markus Meier	10	Introduction and students' presentations supervised by Prof. Markus Meier and NN

Exercises and tutorials	Hours	Contents
Prof. Dr. Markus Meier, Madline Kniebusch, Florian Börgel, Dr. Claudia Frauen, Dr. Hagen Radtke, Dr. Michael Naumann	22	Exercises, tutorials and excursion/exhibition, students group work supervised by Prof. Markus Meier, Florian Börgel, Madline Kniebusch, Dr. Claudia Frauen, Dr. Hagen Radtke