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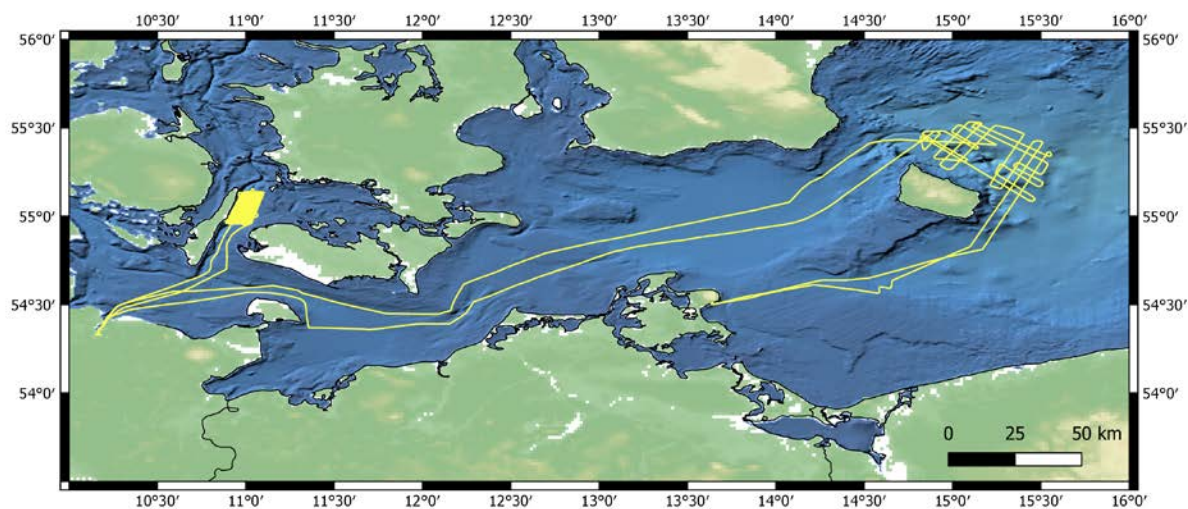
## **Short Cruise Report R/V ALKOR AL545**

**Kiel – Kiel (Germany)**

**18<sup>th</sup> - 29<sup>th</sup> September 2020**

**Chief Scientist: Prof. Dr. Christian Hübscher**

**Captain: Marc Petrikowski**



## Objectives

In the course of the field exercise and in order to fulfil the pretention of combining education and research the student participants learn

- to install deck gear and lab instruments in accordance with safety instructions,
- to plan marine geophysical profiling in terms of selecting profile locations, length and orientations in dependency of the current scientific aims,
- to calculate a daily schedule,
- to communicate plans with the bridge,
- to prepare, maintain, deploy and retrieve seismic sources and marine magnetometer/gradiometer,
- to process reflection seismic data with VISTA processing software (CMP-binning, bandpass filtering, gain, velocity determination, stack, poststack-time migration),
- to interpret collected data in terms of cruise specific scientific aims,
- to behave correctly in a closed, special working environment like a research vessel.

In order to demonstrate a research cruise, it was intended to study the interaction between late Cretaceous to early Tertiary inversion tectonics and sedimentation northeast of Bornholm during the first two cruise legs. These data complete a data set that has been collected in Swedish territorial waters in 2019. During the third leg, the continuation of a west-east striking graben system has been mapped.

## Narrative

The AL545 Scientific Party of seven scientists arrived at RV ALKOR at the GEOMAR Pier on September 17 19 at 11:00, where they unloaded the equipment from a truck and started with installations on deck and the labs. Owing to the COVID-19 pandemic the entire scientific party comprised only seven persons, four students, two tutors and the chief scientist. The RV ALKOR departed from Kiel in the morning of 18 September and began her transit to Mecklenburg Bay. Between 09:00 and 10:30 the junior participants participated in the mandatory security introduction and a tour around the ship, during which all safety equipment and safety measures were explained by the chief mate. The transit ended at 13:00 east of Fehmarn, where two MicroEel streamers and a Mini-GI seismic source were deployed. Since no marine mammals were detected during the mitigation period, the low energy seismic source was released the first time. The following two hours were used to optimize the Injector delay, trigger interval and streamer setup. At 16:15 all gear was put back on deck, and the vessel started its transit towards Bornholm. The evening was used for a summary talk in which the scientific goals of the cruise were summarized.

In the morning of 19 September at 08:00 the deployment of the seismic gear and the marine mammal mitigation started. After a short instrument test and a soft start of the seismic source measurements along the first seismic profile across the Sorgenfrei-Tornquist Zone started. Based on some test shots the seismic processing flow was determined by the tutors. In the afternoon, the student participants got a thorough introduction into watch keeping duties, which included seismic processing. Profiling continued until September 21. After lunch, all towed gear was put on deck and the vessel

transited to Sassnitz (Rügen) harbor, where RV ALKOR arrived at 16:00. Four students disembarked and were replaced by four newcomers. The evening was used for a first introduction into the rules on board, the scientific installations, and a wrap up of scientific findings during the first cruise leg.

The vessel left Sassnitz harbor on September 22 at 08:00. The safety introduction was held at 09:00 during the transit back to the Bornholm area. After arrival early afternoon, the seismic equipment as well as the marine magnetometer was deployed and the scientific profiling commenced. Several profiles perpendicular to the local dominant tectonic fault systems provided insight into the interaction between inversion tectonics and sedimentation. Cross profiles helped to link the seismic stratigraphy between the individual profiles. These measurements lasted until September 24 10:20, when all towed gear was recovered. Around noon, the transit to Kiel started.

The second leg ended on September 25 at 08:00 a.m. when the ship docked at its pier on the west coast of the Kieler Förde. Five students disembarked and the remaining scientists and crew welcomed the five newly arrived students. The transit to the working area east of northern Langeland started one hour later and lasted until 13:30. The transit was used for safety instructions and first introductions into the installed scientific gear. Profiling commenced at 15:00. Altogether 26 profiles were collected in the eastern prolongation of a West-East striking, Pleistocene and possibly fault controlled graben in northern Langeland. The data processing flow for the seismic data was refined. Underway data processing was in full swing early next day. The working program was fulfilled on September 28 at 11:00. All gear was recovered and placed on deck and the transit back to Kiel started. The data processing was continued while all scientific devices on deck were disassembled into their components before packing. RV ALKOR arrived the EOMAR pier at 17:00, when the last boxes were stowed away and lashed. On September 29 all equipment was unloaded and the scientific crew disembarked – AL545 was over.

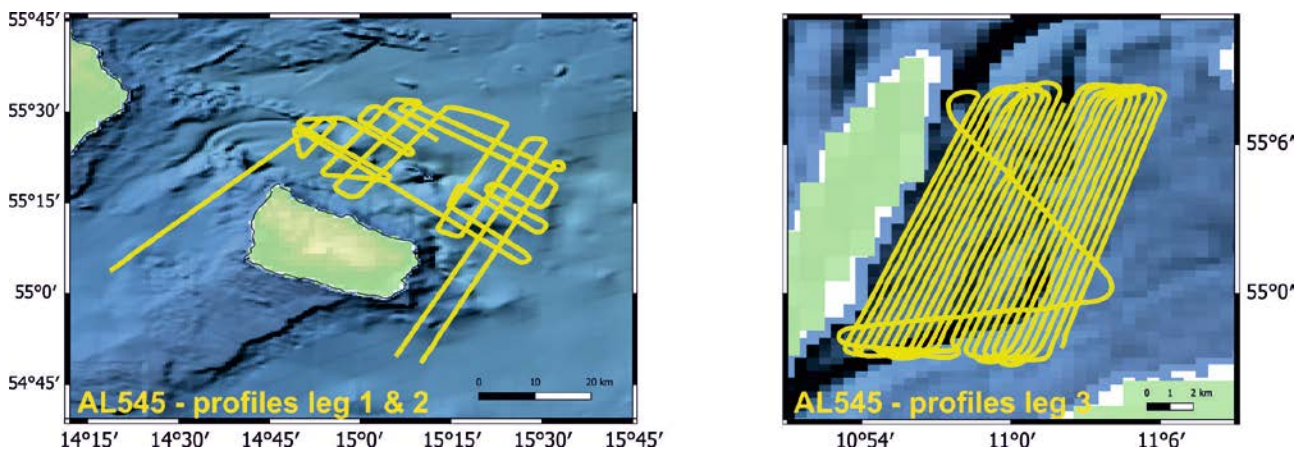


Figure 1 – Profile maps for all three cruise leg.

## Acknowledgements

We like to thank Captain Marc Petrikowski and the professional crew of the RV ALKOR for their enthusiastic support during the entire cruise that enabled us to successfully complete our working program in a good atmosphere on board.

## Cruise participants

Name	Leg	Task	Institute
Prof. Dr. Hübscher, Christian	1-3	Chief scientist	IfG-UHH
Haecker, Tobias	1-3	Tutor	IfG-UHH
Preine, Jonas	1-2	Tutor	IfG-UHH
Aster, Malte Steffen	1	Student	IfG-UHH
Dittmers, Carina	1	Student	IfG-UHH
Bogner, Laura	1	Student	IfG-UHH
Ehlies, Vanessa	1	Student	IfG-UHH
Chung, Ji In	2	Student	IfG-UHH
Lackner, Max	2	Student	IfG-UHH
Wodtke, Vincent	2	Student	IfG-UHH
Uhl, Karolina Julia	2	Student	IfG-UHH
Maaß, Regina	3	Tutor	IfG-UHH
Behr, Christian	3	Student	IfG-UHH
Devdariani, Ana	3	Student	IfG-UHH
Rehm, Alina	3	Student	IfG-UHH
Eßbach, Viktor	3	Student	IfG-UHH

### IfG-UHH

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## Station list

Station Number	MCS Profile	Start Date	Start Time (UTC)	Start Latitude (°N)	Start Longitude (°E)	End Date	End Time (UTC)	End Latitude (°N)	End Longitude (°E)	Length (km)
MCS/SES		LEG 1								
AL545_1-2	TP(1)	19.09.20	6:52	55°04.1'	14°19.1'	19.09.20	07:34	55°06.3'	14°22.2'	5,5
AL545_2-2	02	19.09.20	07:34	55°06.3'	14°22.2'	19.09.20	14:48	55°28.8'	14°53.8'	56,9
AL545_2-2	03	19.09.20	15:14	55°27.9'	14°55.6'	19.09.20	16:41	55°22.8'	14°50.8'	21,2
AL545_2-2	04	19.09.20	17:57	55°26.9'	14°50.1'	19.09.20	01:25	55°05.4'	15°25.9'	61,5
AL545_2-2	05	20.09.20	02:16	55°07.4'	15°26.2'	20.09.20	04:40	55°14.5'	15°14.5'	24,9
AL545_2-2	06	20.09.20	05:35	55°17.7'	15°16.8'	20.09.20	08:00	55°10.4'	15°28.6'	23,8
AL545_2-2	07	20.09.20	08:44	55°12.1'	15°29.7'	20.09.20	10:13	55°16.2'	15°21.9'	16,9
AL545_2-2	08	20.09.20	10:53	55°17.9'	15°23.2'	20.09.20	11:57	55°14.5'	15°29.2'	18,8
AL545_2-2	09	20.09.20	13:08	55°18.6'	15°31.3'	20.09.20	17:15	55°30.4'	15°06.7'	33,9
AL545_2-2	10	20.09.20	17:39	55°31.3'	15°08.7'	20.09.20	21:26	55°20.6'	15°32.2'	37,6
AL545_2-2	11	20.09.20	22:09	55°21.1'	15°32.0'	21.09.20	08:33	55°49.6'	15°10.7'	62,7
MCS/SES/Mag		LEG 2								
AL545_4-2	12	22.09.20	13:45	54°49,9'	15°06,0'	22.09.20	22:02	55°24,7'	15°30,5'	69,8
AL545_4-2	13	22.09.20	22:36	55°25,1'	15°27,2'	23.09.20	02:15	55°09,8'	15°16,8'	30,6
AL545_4-2	14	23.09.20	03:00	55°11,2'	15°13,1'	23.09.20	06:25	55°15,6'	15°24,0'	32,5
AL545_4-2	15	23.09.20	09:28	55°30,3'	15°13,8'	23.09.20	13:00	55°16,2'	15°59,8'	30,0
AL545_4-2	16	23.09.20	13:51	55°18,1'	14°56,2'	23.09.20	17:14	55°31,2'	15°09,7'	28,1
AL545_4-2	17	23.09.20	18:01	55°31,4'	15°04,7'	23.09.20	20:48	55°20,3'	14°53,8'	23,6
AL545_4-2	18	23.09.20	22:30	55°19,6'	15°04,1'	24.09.20	01:00	55°27,5'	14°50,3'	20,6
AL545_4-2	19	24.09.20	02:18	55°28,4'	14°58,2'	24.09.20	03:59	55°23,0'	15°07,7'	14,1
AL545_4-2	20	24.09.20	04:22	55°24,0'	15°07,9'	24.09.20	05:48	55°28,5'	15°00,0'	11,9
AL545_4-2	21	24.09.20	06:35	55°30,8'	15°04,0'	24.09.20	08:19	55°25,4'	15°12,6'	14,2
MCS/SES		LEG 3								
AL545_5-2	22	25.09.20	12:48	54°57,9'	11°02,0'	25.09.20	15:05	55°07,8'	11°02,1'	19,0
AL545_5-2	23	25.09.20	15:24	55°07,7'	11°04,3'	25.09.20	17:48	54°57,7'	10°59,6'	19,3
AL545_5-2	24	25.09.20	18:13	54°57,9'	11°01,6'	25.09.20	20:29	55°07,7'	11°05,8'	18,8
AL545_5-2	25	25.09.20	20:52	55°7,6'	11°03,7'	25.09.20	23:07	54°57,9'	10°59,3'	18,8
AL545_5-2	26	25.09.20	23:33	54°57,8'	11°01,1'	25.09.20	01:49	55°07,7'	11°05,5'	19,1
AL545_5-2	27	26.09.20	02:15	55°07,6'	11°03,4'	25.09.20	04:38	54°57,7'	10°58,9'	19,1
AL545_5-2	28	26.09.20	06:01	54°57,5'	11°00,8'	26.09.20	07:16	55°07,2'	11°5,09'	18,8
AL545_5-2	29	26.09.20	07:42	55°7,6'	11°03,1'	26.09.20	09:55	54°57,8'	10°58,5'	18,9
AL545_5-2	30	26.09.20	10:21	54°57,87'	11°00,4'	26.09.20	12:36	55°07,7'	11°04,7'	19,0
AL545_5-2	31	26.09.20	12:59	55°07,8'	11°02,8'	26.09.20	15:20	54°57,8'	10°58,2'	19,2
AL545_5-2	32	26.09.20	15:42	54°57,9'	11°00,1'	26.09.20	17:59	55°07,7'	11°04,4'	18,7
AL545_5-2	33	26.09.20	18:24	55°07,6'	11°02,4'	26.09.20	20:38	54°57,8'	10°57,6'	19,2
AL545_5-2	34	26.09.20	21:23	54°58,6'	10°53,5'	26.09.20	22:39	54°59,6'	11°03,3'	10,7
AL545_5-2	35	26.09.20	22:58	55°00,8'	11°03,7'	27.09.20	00:27	54273	10°53,3'	12,7
AL545_5-2	36	27.09.20	00:59	55°07,7'	10°58,5'	27.09.20	03:05	54°57,9'	10°53,3'	19,3
AL545_5-2	37	27.09.20	03:53	54°58,0'	10°55,6'	27.09.20	06:02	55°07,7'	11°00,5'	18,9
AL545_5-2	38	27.09.20	06:27	55°7,6'	10°58,8'	27.09.20	08:40	54°57,9'	10°53,7'	18,8
AL545_5-2	39	27.09.20	09:03	54°57,9'	10°56,0'	27.09.20	11:15	55°07,7'	11°00,8'	19,0
AL545_5-2	40	27.09.20	11:34	55°07,8'	10°59,2'	27.09.20	14:00	54°57,7'	10°54,0'	19,4
AL545_5-2	41	27.09.20	14:24	54°58,0'	10°56,3'	27.09.20	16:22	55°07,8'	11°01,2'	19,0
AL545_5-2	42	27.09.20	16:44	55°07,7'	10°59,5'	27.09.20	19:21	54°57,9'	10°54,5'	19,0
AL545_5-2	43	27.09.20	19:42	54°58,0'	10°56,8'	27.09.20	21:48	55°7,7'	11°1,5'	18,8
AL545_5-2	44	27.09.20	22:06	55°07,8'	11°0,1'	28.09.20	0:36	54°57,9'	10°54,9'	19,2
AL545_5-2	45	28.09.20	0:56	54°57,9'	10°57,9'	28.09.20	3:07	55°7,9'	11°1,9'	19,2
AL545_5-2	46	28.09.20	3:40	55°7,7'	11°0,2'	28.09.20	6:16	54°57,9'	10°55,2'	18,9
AL545_5-2	47	28.09.20	6:54	54°58,0'	10°57,6'	28.09.20	8:52	55°7,8'	11°2,2'	18,7

Summ: 1090 km. Bornholm (Leg 1&2): 628 km. Langeland (Leg 3): 462 km.