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# Russian-German Cooperation: Expeditions to Siberia in 2019

Edited by
Matthias Fuchs, Dmitry Bolshiyanov, Mikhail Grigoriev, Anne Morgenstern, Luidmila Pestryakova, Leonid Tsibizov, and Antonia Dill

with contributions of the participants

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Herausgeber
Dr. Horst Bornemann

Redaktionelle Bearbeitung und Layout
Birgit Reimann

Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und Meeresforschung
Am Handelshafen 12
27570 Bremerhaven
Germany

www.awi.de
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Editor
Dr. Horst Bornemann

Editorial editing and layout
Birgit Reimann

Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und Meeresforschung
Am Handelshafen 12
27570 Bremerhaven
Germany

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*Titel: Zwischenstopp auf der Straße von Yakutsk nach Nyurba, Zentraljakutien, Republik Sakha, Russland, um geeignete Standorte für die Untersuchung der Regeneration von Wäldern nach Waldbränden zu finden (Foto: Elisabeth Dietze, AWI).*

*Cover: Stopping along the way from Yakutsk to Nyurba, Central Republic of Sakha, Russia, to search for suitable sites to explore post-fire forest recovery. (Photo: Elisabeth Dietze, AWI).*

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## 3.20 Deep geophysical structure of the Lena Delta southern part

*Vladimir V. Potapov [1,2], Anna A. Zaplavnova [1,2], Alexandr N. Schein [1,2], Egor I. Esin [1,2]*

[1] A.A. Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia

[2] Novosibirsk State University, Novosibirsk, Russia

**Fieldwork period and location**
From August 1st to August 14th, 2019 (on the Lena Delta southern part).

**Objectives**
Due to the cover of the Quaternary sediments, the deep structure of the folded region has been studied very poorly. The main goal of our studies is to make a geoelectrical model for the southern part of the region. And the main points are:
To determine the depth of the permafrost base or the boundaries of the melting zone in the channel part of the Lena Delta and on its ridges.
To indicate depth and activity of the main Lena fault, and study of other buried faults in the channel part.

**Methods**
Magnetotelluric sounding:
The survey was carried out using a Canadian MT station MTU -5a from "Phoenix Geophysics Ltd", with a measuring range from 0.003 to 10000 s. The measurements included four components of the MT field (Ex, Ey, Hx, Hy). A standard MTZ measurement plan (x-shape) was used. Steps between points were approximately 5 km.

**Preliminary results**
We made a MT profile, which included the measurement of seven points. The profile is shown in Figure 3.20.1.

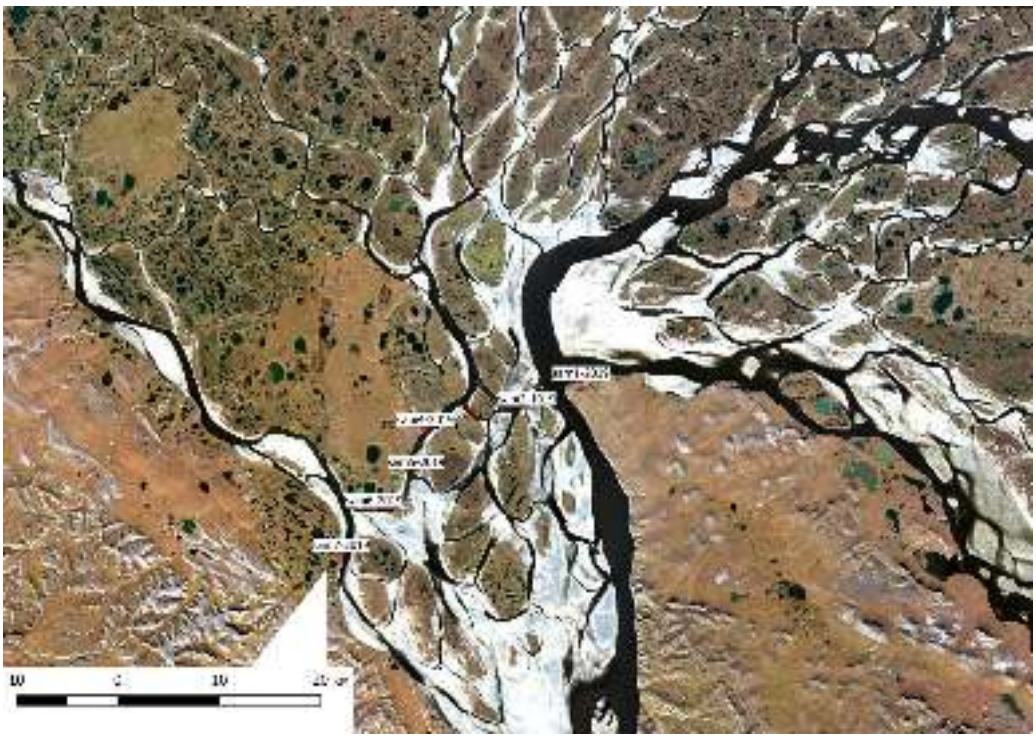

Figure 3.20.1: *Location of the measurement points*

The method reveals the structure to a depth of approximately 10 km. The result of the preliminary data processing revealed 1D models for each point. The main layers with different resistivity are shown in the section Figure 3.20.2.

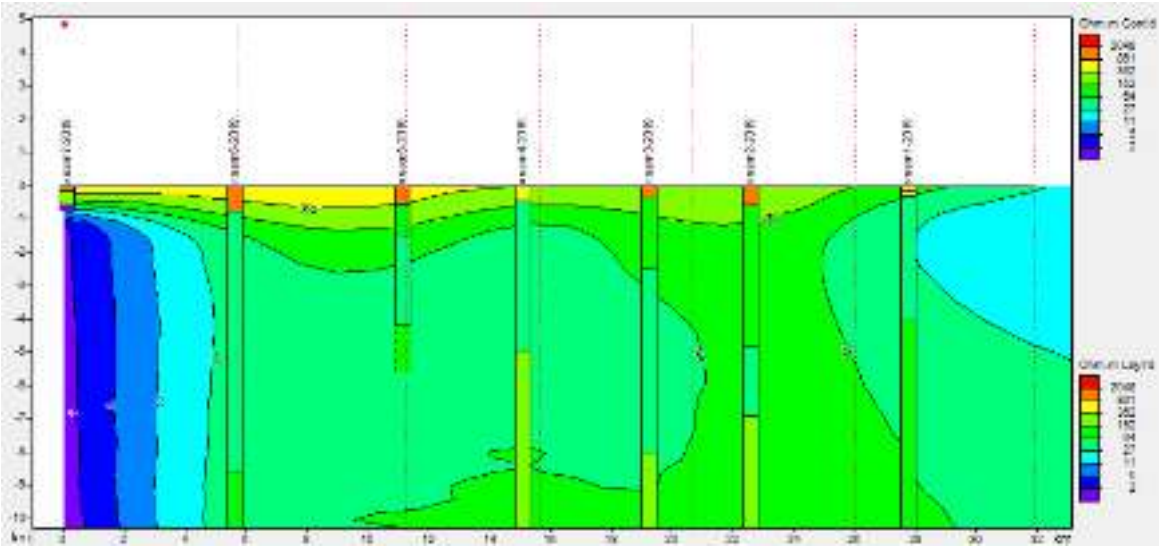

Figure 3.20.2: *The MTZ resistivity cross-section, 1D models for each point are shown in columns. The color scale in the right presents resistivity values.*

The section has been divided into 3 layers as a result of processing. The high resistivity level in the upmost layer is typical for permafrost. The base depth of this layer varies from 140 m on point 7 to 730 m on point 6. For the second layer, typical resistivity values vary from 64 to 156 Ohm·m, which is interpreted as the sedimentary bed rock. This layer predictively consists of the material carried by the river. The third layer with the lowest resistivity values from 27 to 64 Ohm·m can supposedly be explained as limestone bed. The outcrop of these rocks was recognized near the polar station Sokol.
The main results of the geophysical studies using the MT method is the possibility to divide the interior into three main layers to a depth of around 10 km. Therefore, we can study in depth the structure and properties for each layer with other methods.