

# Scientific Achievements of the Karlsruhe Geophysical Institute 1964-2000– I.

C. Prodehl, K. Fuchs, F. Wenzel, J. Ritter, K.-P. Bonjer, B. Müller, W. Zürn, H. Wilhelm & T. Bohlen

## Overview

- In 1964 the Geophysical Institute was founded at the Universität Karlsruhe (TH). Since Oktober 2009 it is part of the Karlsruhe Institute of Technology.
- Here we present some of the main scientific achievements which were accomplished until about 2000.

### 1. Early History

Concentration on active and passive seismology, theory & its application.

- Stephan Mueller proves the existence of a world-wide crustal low-velocity layer.
- Karl Fuchs and Gerhard Müller develop the reflectivity method.

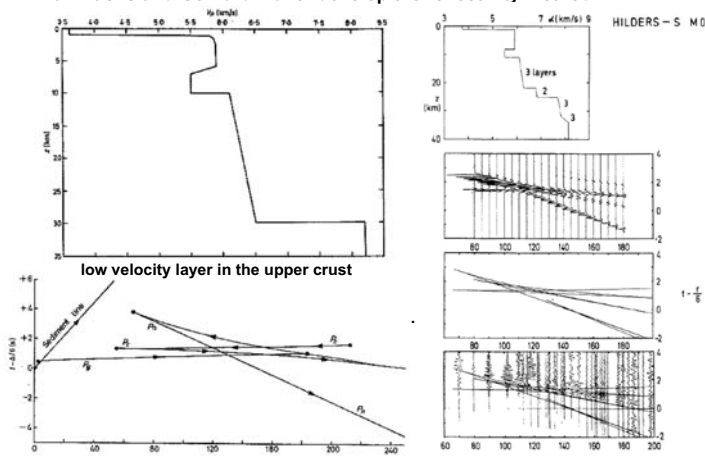


Fig.: Crustal models and seismic phases incl. synthetic seismogram modelling with the reflectivity method.

### 2. Crust-Mantle Studies

- Joint Karlsruhe – GFZ Potsdam experiments with the new GFZ instrument pool to explore the crust and upper mantle around the world.
- High resolution of deep-seismic sounding helps to understand subsurface tectonics, geodynamics and processes.

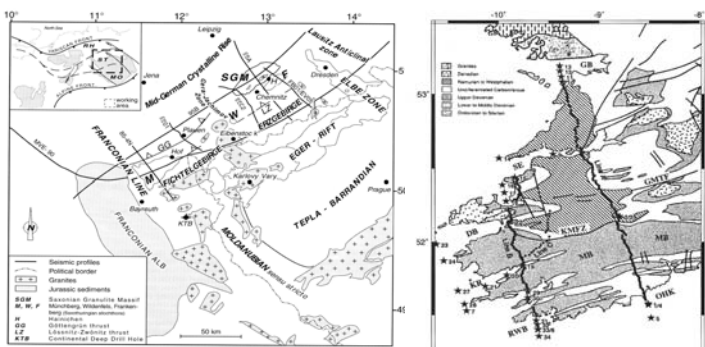


Fig.: Map of GRANU-95 DSS experiment.

Fig.: VARiscan front NETWORK-96.

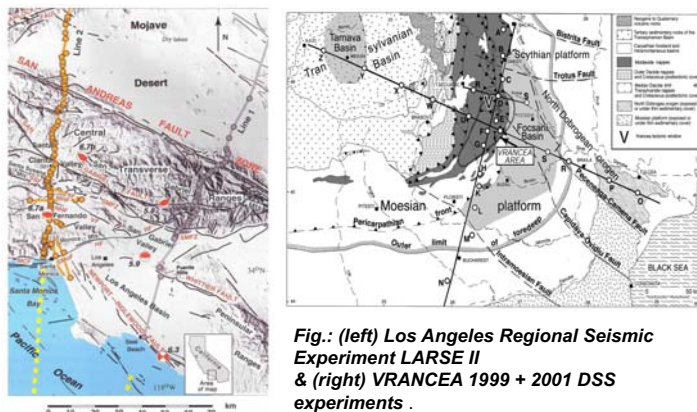


Fig.: (left) Los Angeles Regional Seismic Experiment LARSE II & (right) VRANCEA 1999 + 2001 DSS experiments.

### 3. Upper Mantle Long-Range Profiles

- Detection of the fine structure of the subcrustal lithosphere.

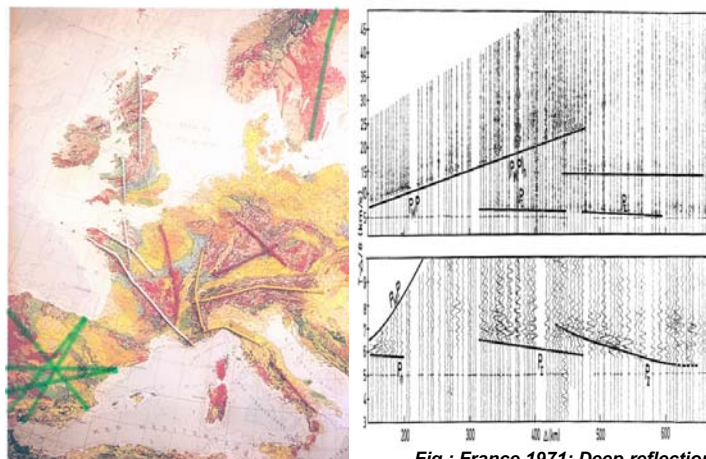


Fig.: Long-range profiles in Europe 1970-80.

Fig.: France 1971: Deep reflections at 50 km & 80 km depth.

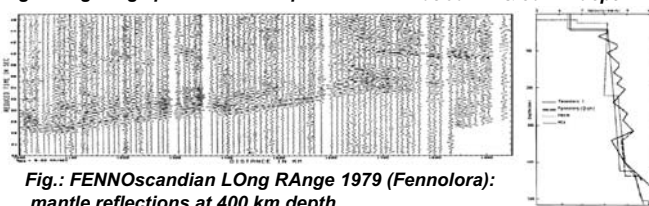


Fig.: FENNOscandian Long Range 1979 (Fennolora): mantle reflections at 400 km depth.

### 4. Rifting – Deep Seismic Sounding

- European Cenozoic Rift System: Upper Rhine Graben, Limagne Graben and Bresse Graben active and passive seismic experiments
- Afro-Arabian Rift System: Dead Sea transform and Kenya Rift International Seismic Projects (KRISP) in East Africa. Moho depth was found in average 5 km less under the rift interiors compared to the rift flanks.

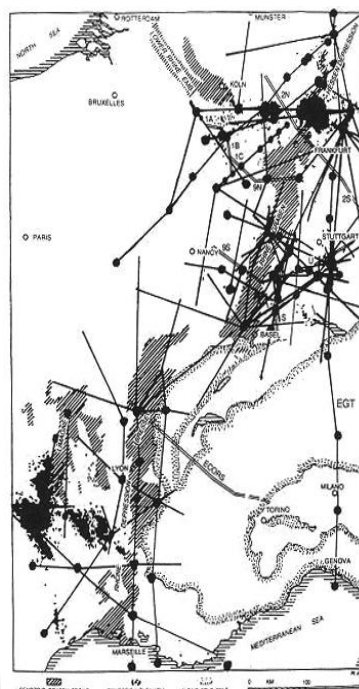


Fig.: Seismic refraction lines in and around the European Cenozoic Rift System (ECRIS) including the European GeoTraverse (EGT).

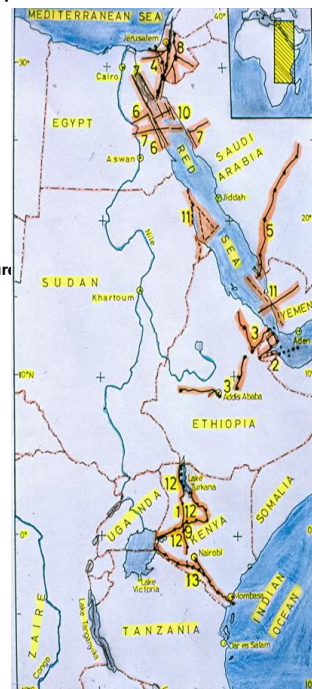


Fig.: Seismic refraction lines in and around the Afro-Arabian Rift System 1969-1994; 4, 8, 12, 13 Karlsruhe et al projects.