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Interpretation of an aerogeophysical survey (gamma ray spectrometry, electromagnetics and magnetics) in the KTB area

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In the area of the KTB an aerogeophysical survey was carried out with helicopters by the Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) in 1991 in order to complete the ground geophysical surveys (Röttger et al. 1991). Spacing between profiles was 200 m and the mean flight elevation above terrain level was 87 m. Gamma ray spectroscopy yielded a concentration of U, Th and K and the total count. Electromagnetic induction at frequencies of 886 Hz, 7220 Hz and 31519 Hz gave an information of electrical conductivities at different depths. The magnetic total field intensity was measured with a resolution of 0.1 nT using a Cs-magnetometer. A preprocessing of the raw data was performed by the BGR.

The gamma ray spectroscopy data and the electromagnetic data were used for a controlled classification in order to identify geological classes by multivariate analysis (Maus 1993). Three in phase and three quadrature electromagnetic signals and four radiometric signals yielded a total of 10 parameters for the classification. From the available geological map (NLfB/BGL 1991) 13 main geological classes were choosen for training and calibration of the classification in homogeneous areas. The classification used a minimum distance method, a maximum likelihood method and discriminant analysis.

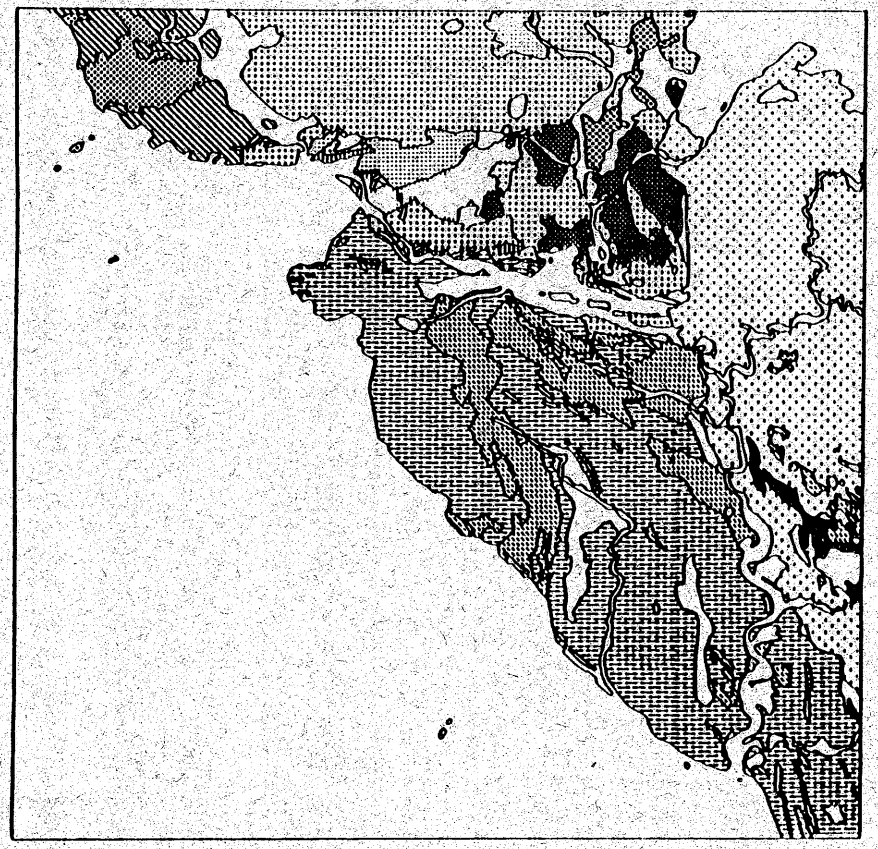
Discriminant analysis yielded the best results with a quantitative difference from the geological map of only 31 %. Fig. 1 shows the schematic geological map of the area together with the "geological" map obtained by the controlled classification of the aerogeophysical data by discriminant analysis. Sedimentary areas were not included into the classification. There is an overall good agreement with the geological map, but there are also noticeable differences, especially for classes of basic rock types. For these classes the aeromagnetic data can be used for an additional discrimination.

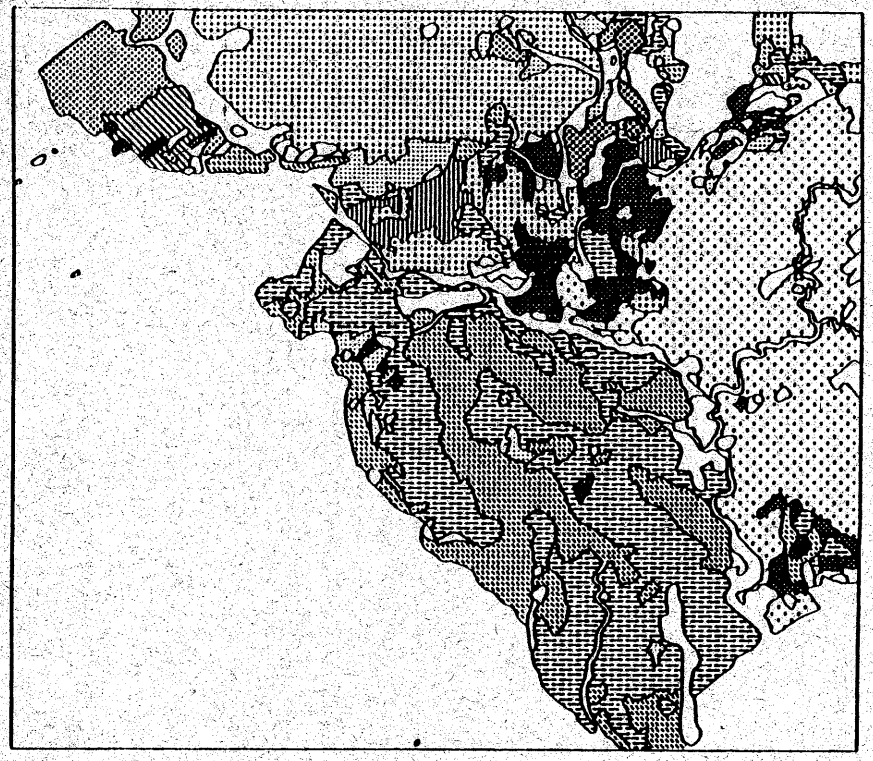
References:

Niedersächsisches Landesamt für Bodenforschung und Bayerisches Geologisches Landesamt (ed.), 1991: Geologische Karte des KTB-Umfeldes 1 : 50 000

Röttger B., Fluche B., Voß W., Rehli H.J., 1991: Aerogeophysikalische Hubschrauber-Messungen im Umfeld der KTB.Technischer Bericht NKTB 1993

Maus S, 1993: Auswertung der Radiometrie, Elektromagnetik und Magnetik einer Hubschrauberbefliegung im Umfeld der Kontinentalen Tiefbohrung, Oberpfalz. Diplomarbeit (unpublished), Institut für Allgemeine und Angewandte Geophysik, München, 113 S.





	Bt	Tertiärer Basalt
	G_s	Steinwald-Granit
	G_{sF}	Friedenfels-Granit
	mG	Granit-Granodiorit
	G	Falkenberger und Leuchtenberger Granit
	Gd-Dr	Granodiorit-Diorit mit wechselnden granitischen Anteilen (Redwitzit)
	op	Phyllitischer Tonschiefer, quarzitischer Schiefer und Quarzit
	R	Quarz-Albit-Serizit-Schiefer
	siW	Phyllitischer Glimmerschiefer, Graphit-, Metakieselschiefer und Quarzit
	EG,Bs	Metabasit, z.T. Hornfels, der Erbendorfer Grünschieferzone (EG)
	EG,S	Serpentinit, Serpentinit-Hornfels und Serpentinit-Hofgestein der EG
	EV,g	Gneis der Zone von Erbendorf-Vohenstrauß (EV)
	EV,Am	Amphibolit der Zone von EV

Fig. 1: Comparison of the geological map of the KTB area (left side) with a map produced by the classification of radiometric and electromagnetic data (right side). Sedimentary areas in the SW were not included into the classification.