Acknowledgements

Naturally, a work like this develops well only in a convenient environment. I am very grateful that I had such an environment in form of the helpful persons numerated below.
So I would like to thank

... Prof. Volker Haak for suggesting the topic, for his accompanying supervision of this work, and for his uncomplicated availability in spite of retirement and long spatial distance,

... Dr. hab. Oliver Ritter for being second reviewer and for many critical remarks and valuable discussions. The latter holds also for members of his working group Juliane Hüb and Ute Weckmann.

... Prof. Jerzy Jankowski and Dr. Heinrich Brasse, in whose working groups I found a good base for science and life,

... Michael Becken, Heinrich Brasse, Tomasz Ernst, Diane Eydam, Andreas Gerner, Marek Irisik, Waldemar Jóźwiak, Florian Karpfinger, Krzysztof Kucharski, Borys Ladanivskyy, Janusz Marianiuk, Lutz Mütschard, Mariusz Neska, Benedykt Pachocki, Nikolay Palshin, Daniela Polag, Jan Reda, Elena Sokolova, Yuri Sumaruk, Sebastian Tomczyk, Ivan Varentsov, and Tamara Worzewski for their activity in the field,

... Dr. Hans-Joachim Linthe and Jan Reda for providing data from geomagnetic observatories Niemegk and Belsk,

... Daniela Polag for valuable hints concerning implementation of magnetotelluric data processing,

... Dr. Krzysztof Nowożyński for his concrete and considerate answers on my questions concerning mathematic fundamentals,
... Dr. Joachim Bellach, Prof. Jerzy Jankowski, and Dr. Waldemar Jóźwiak for help at providing literature,

... Dr. Ivan Varentsov for his encouraging example at dealing with big datasets of multinational origin including observatory data,

... the Berlin-Potsdam MT-AG, the seminar of magnetism group Warsaw, and the EMTF colloquium at Wohldenberg in 2005 for being forums where the developing work could be presented and discussed,

... and last not least, my family for steady considerateness and help.