Foreword

This book is a small contribution to pedometric methodology, specifically to mapping methods. It could serve as a handbook or a user's guide for anyone seeking to collate soil geoinformation. Pedometrics is an emerging field of science that is bound to attract more and more attention from the soil scientists in the near future. It could also have an impact on other sciences dealing with natural resources and on biometrics in general. For example, vegetation mappers work with similar datasets and face similar problems when modelling the spatial variation of vegetation or when seeking the best classification system. For pedometricians, the true acknowledgement of their work will come when we read about continuous vegetation, geomorphological, geological or civil engineering maps, developed according to the concepts of continuous soil mapping.

Those readers who would require more technical details about specific methods or would even like to use some of my datasets, should note that there is a supplementary CD-ROM at the back of the book[1]. There you will find additional documents such as technical and lecture notes[2] (e.g. "Comparison of kriging with external drift and regression-kriging" and "Digital terrain analysis in ILWIS"), animations and full colour graphics that could not be fitted into this book. My homepage web address[3] can also be used to access these supplementary materials.

Before presenting the thesis, it might be of interest to outline the genesis of each chapter and how I found my collaborators. This is a small *curriculum* of major activities:

We first began discussing the usability of soil maps in Croatia in 1999 during field-work in Baranja. At that time, Dr. Rossiter (my supervisor) was introduced to Dr. Stjepan Husnjak and Prof. Bogunović from the Department of Soil Science in Zagreb. We have described two full profiles together and *ad hoc* discussed about

---

[1]The CD-ROM is only available in a limited number of copies. Part of this material is also available on-line.

[2]Caution — most of these materials are unpublish and contain possible errors and misstatements.

[3]See the full address in Curriculum Vitae, at the end of the book.

the differences and difficulties in existing local soil classification systems and soil maps. The Baranja dataset was used to test the applicability of terrain parameters for aerial photo-interpretation (chapter 4). In March 2003, I began my PhD study with the same supervisor. My predecessor on the Division of Soil Science, Dr. van Groenigen, just defended a thesis on spatial sampling optimisation. Hence, the most logical promotor was Prof. Stein who has been teaching geostatistics at ITC and with whom I latter on wrote two chapters of my thesis. In June of 2001, Dr. Rossiter came to Croatia for a second time, during which we produced additional eight full profile descriptions. This time the observations were drawn from the whole country. In Split, we visited the Institute for Adriatic crops and Karst reclamation, where we were introduced to the work of Dr. Miloš. In September 2001, I participated in my first Pedometrics conference with an oral presentation, in which I proposed a sampling methodology that considers point allocation in the feature space (chapter 2).

In February 2002, Stjepan came to ITC as a visiting scientist and we began work on the quality of soil data in Croatia (chapter 8). The major part of the data used in this report was collected and processed during June 2002, when we produced soil maps of control areas. In March of the same year, I went to the GSTAT meeting in Reading with some raw ideas for the generic framework for spatial prediction. The presentation was very useful as Dr. Papritz and Dr. Gerard Heuvelink offered important suggestions that helped me develop the generic framework (chapter 5). Subsequently, Gerard suggested that I also take over the web-administration of the pedometrics website, which I gladly accepted. Gerard also introduced me to the theory of universal kriging and generalized least square estimation, which then helped me to develop equations for sampling optimization in feature space and for generic framework based on regression-kriging. In July and August, I went for a long trip to Melbourne, Sydney and Bangkok (Accuracy conference and World Congress of Soil Science). At the Accuracy conference in Melbourne, I received interesting comments on my work on continuous maps from the Accuracy participants (chapter 6), which helped me to improve the paper. Prof. Fisher specifically suggested that I replace the saturation with brightness in coding the uncertainty in the colour mixture algorithm. Following my acquaintance with Dr. Odeh and Dr. Budiman from the Pedometrics 2001 conference in Ghent, I then moved to University of Sydney, Agricultural Chemistry and Soil Science Department. I followed the path of Dennis Walvoort, a former (regular) visiting scientist at this Department and my collaborator. The visit to Sydney was especially inspiring for my future work. In Bangkok, I had the privilege of presenting a paper on the use of auxiliary maps to improve the mapping of soil variables from existing datasets[4]. At that time, pedometrics has

---

[4]My final suggestion of how to achieve this is given in chapter 7

been promoted to a provisional commission under IUSS, which was a good sign for all of us.

During the last year of my study I was mostly in Enschede working on my publications. In February 2003, I went to Zürich, where I was collaborating with my fellow college Stephan Gruber (PhD student at the Department of Geography) on methodology for reduction of errors in terrain parameters (chapter 3). From this collaboration we also developed a lecture note — "Digital Terrain Analysis in ILWIS", which is available in the supplementary materials.

---

[5]I was choosing between six international institutes/universities: University of Florida, Arizona, Cranfield, Reading, Wageningen and ITC.