Afterword

Both parts of this book have quite consciously tried not to give authoritative advice on choices of methods or techniques.[1] The handling and analysis of spatial data with R continues to evolve – this is implicit in open source software development. It is also an important component attempting to offer applied researchers access to accepted and innovative alternatives for data analysis, and applied statisticians with representations of spatial data that make it easier to test and develop new analytical tools.

A further goal has been to provide opportunities for bringing together the various camps and traditions analysing spatial data, to make it somewhat easier to see that their ways of conducting their work are not so different from one another in practise. It has always been worrying that fields like disease mapping or spatial econometrics, with very similar data scenarios, make different choices with regard to methods, and treatments of the assumptions underlying those methods, in their research practise. Research practise evolves, and learning from a broader spread of disciplines must offer the chance to avoid choices that others have found less satisfactory, to follow choices from which others have benefitted and to participate in innovation in methods.

This makes participation in the R community, posting questions or suggestions, reporting apparent bugs not only a practical activity, but also an affirmation that science is fostered more by openness than the unwarranted restriction of findings. In the context of this book, and as we said in the preface, we would be grateful for messages pointing out errors; errata will be posted on the book website (`http://www.asdar-book.org`).

[1] An illustration from an email exchange between the authors: "I think we are trying to enable people to do what they want, even if they shoot themselves in the feet (but in a reproducible way)!"

R and Package Versions Used

- R version 2.6.2 (2008-02-08), `i686-pc-linux-gnu`
- Base packages: base, datasets, graphics, grDevices, methods, stats, utils
- Other packages: adapt 1.0-4, boot 1.2-32, class 7.2-41, classInt 0.1-9, coda 0.13-1, DCluster 0.2, digest 0.3.1, e1071 1.5-18, epitools 0.4-9, foreign 0.8-24, gpclib 1.4-1, graph 1.16.1, gstat 0.9-44, lattice 0.17-6, lmtest 0.9-21, maps 2.0-39, maptools 0.7-7, Matrix 0.999375-9, mgcv 1.3-29, nlme 3.1-88, pgirmess 1.3.6, pkgDepTools 1.4.1, R2WinBUGS 2.1-8, RandomFields 1.3.30, RBGL 1.14.0, RColorBrewer 1.0-2, rgdal 0.5-24, Rgraphviz 1.16.0, sandwich 2.1-0, sp 0.9-24, spam 0.13-2, spatialkernel 0.4-8, spatstat 1.12-9, spdep 0.4-20, spgrass6 0.5-3, spgwr 0.5-1, splancs 2.01-23, tripack 1.2-11, xtable 1.5-2, zoo 1.5-0
- Loaded via a namespace (and not attached): cluster 1.11.10, grid 2.6.2, MASS 7.2-41, rcompgen 0.1-17, tools 2.6.2

Data Sets Used

- Auckland 90 m Shuttle Radar Topography Mission: downloaded on 26 September 2006 from the US Geological Survey, National Map Seamless Server `http://seamless.usgs.gov/`, GeoTiff file, 3 arcsec 'Finished' (90 m) data; file `70042108.zip` on book website.
- Auckland shoreline: downloaded on 7 November 2005 from the National Geophysical Data Center coastline extractor `http://www.ngdc.noaa.gov/mgg/shorelines/shorelines.html`; file `auckland_mapgen.dat` on book website.
- Biological cell centres: available as `data(cells)` from **spatstat**, documented in Ripley (1977).
- Broad Street cholera mortalities: original files provided by Jim Detwiler, who had collated them for David O'Sullivan for use on the cover of O'Sullivan and Unwin (2003), based on earlier work by Waldo Tobler and others; this version is available as a compressed archive of a GRASS location in file `snow_location.tgz`, and a collection of GeoTiff and shapefiles exported from this location in file `snow_files.zip` on the book website.
- California redwood trees: available as `data(redwoodfull)` from **spatstat**, documented in Strauss (1975).
- Cars: available as `data(cars)` from **datasets**.
- CRAN mirrors: locations of CRAN mirrors 1 October 2005; file on book website `CRAN051001a.txt`.
- Japan shoreline: available in the `'world'` database provided by **maps**.
- Japanese black pine saplings: available as `data(japanesepines)` from **spatstat**, documented in Numata (1961).
- Lansing Woods maple trees: available as `data(lansing)` from **spatstat**, documented in Gerard (1969).

- Loggerhead turtle: downloaded on 2 November 2005 with permission from SEAMAP, (Read et al., 2003), data set 105; data described in Nichols et al. (2000); file `seamap105_mod.csv` on book website.
- Manitoulin Island: created using `Rgshhs` in **maptools** from the GSHHS high resolution file `gshhs_h.b`, version 1.5, of 3 April 2007, downloaded from `ftp://ftp.soest.hawaii.edu/pwessel/gshhs`.
- Maunga Whau volcano: available as `data(volcano)` from **datasets**.
- Meuse bank: available as `data(meuse)` from **sp**, supplemented by `data(meuse.grid)` and `data(meuse.riv)`, and documented in Rikken and Van Rijn (1993) and Burrough and McDonnell (1998).
- New York leukemia: used and documented extensively in Waller and Gotway (2004) and with data made available in Chap. 9 of `http://www.sph.emory.edu/~lwaller/WGindex.htm`; the data import process is described in the help file of `NY_data` in **spdep**; geometries downloaded from the CIESIN server at `ftp.ciesin.columbia.edu`, file `/pub/census/usa/tiger/ny/bna_st/t8_36.zip`, and extensively edited; a zip archive `NY_data.zip` of shapefiles and a GAL format neighbours list is on the book website.
- North Carolina SIDS: shapefile `sids.shp` (based on geometries downloaded from `http://sal.agecon.uiuc.edu/datasets/sids.zip`) and GAL format neighbour lists `ncCC89.gal` and `ncCR85.gal` distributed with **spdep**, data from Cressie (1993), neighbour lists from Cressie and Chan (1989) and Cressie and Read (1985), documented in the `nc.sids` help page.
- North Derbyshire asthma study: the data has been studied by Diggle and Rowlingson (1994), Singleton et al. (1995), and Diggle (2003); the data are made available in anonymised form by permission from Peter Diggle as shapefiles in a zip archive `north_derby_asthma.zip` on the book website.
- Scottish lip cancer: Shapefile and data file downloaded from the book website of Waller and Gotway (2004), `http://www.sph.emory.edu/~lwaller/WGindex.htm`, Chaps. 2 and 9.
- Spearfish: downloaded as GRASS location from `http://grass.itc.it/sampledata/spearfish_grass60data-0.3.tar.gz`; this data set has been the standard GRASS location for tutorials and is documented in Neteler and Mitasova (2004).
- US 1999 SAT scores: state boundaries available in the `'state'` database provided by **maps**, original attribute data downloaded on 2 November 2005 from `http://www.biostat.umn.edu/~melanie/Data/` and supplemented with variable names and state names; the data set is also available from the website of Banerjee et al. (2004), `http://www.biostat.umn.edu/~brad/data/state-sat.dat`, and the modified version as file `state.sat.data_mod.txt` from the book website.
- US Census 1990 Counties: Three shapefiles for Virginia and North and South Carolina downloaded from the US Census Bureau cartographic boundary files site for 1990 county and county equivalent areas at `http://www.census.gov/geo/www/cob/co1990.html`; one text file by county defining

metropolitan area membership also from the US Census Bureau site `http://blueprod.ssd.census.gov`, file `/population/estimates/metro-city/90mfips.txt` available as file `90mfips.txt` on the book website.

- World volcano locations: downloaded from the National Geophysical Data Center `http://www.ngdc.noaa.gov/hazard/volcano.shtml`, available as file `data1964al.xy` from book website.

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