



Visualisation Workshop Meeting Report Dartington Hall

July 1–3, 2008

We held a three day workshop to scope and begin work on visualisation needs within the QUEST community. On the first day of the workshop the 14 participants, including social and natural scientists, modelers, visualisation experts, brainstormed three main topics: sharing data, analyzing data and displaying it. A summary of these discussions can be found in the table below. The main conclusion of these discussions were

1. the overwhelming need for a community developed library of visualisation tools particular for QUEST scientists
2. that many tools already exist, but they are scattered and incomplete
3. the need to be able to manipulate easily country coded data
4. the need to display uncertainty

Two further needs were repeatedly highlighted but were beyond the scope of this workshop

5. the need for easy to use analysis tools. Suggestions included using a wrap around graphical users interface (a GUI) such as quantum GIS
6. interactive maps which the user can click on to alter and to download data

The outcomes of the meeting included

- The establishment of a Source Forge project to house QUEST visualization packages at <https://sourceforge.net/projects/rworldmap>
- QUEST scientists learned from two invited R experts about how to
 - Make R packages
 - Easily produce comprehensive documentation for R packages
 - And many tips and tricks for writing in R
 - As well as learning about many R resources
- Two new R codes were developed: the first showing country coded data and the second showing how to display more than one variable in a pixel. These will form the basis of the first QUEST Visualization Package and will be posted on Source Forge in the near future.



SUMMARY OF BRAINSTORMING DISCUSSIONS

Category	Features
Data	<ul style="list-style-type: none"> • Importing data – missing data codes (CDAT has a section on it) • NetCDF, text file, excel, HDF, shape files, surfer (ERDDAP – example of database for downloading in a specific format, then post tools in different languages to read it) • Standard datasets • Coast line datasets – GSHHS available in 5 res • Country boundaries (coarse and fine?) • Grids • Data cleaning and merging • Meta data • Attribution of / Copyrights of data ... • Defining a ‘standard’ QUEST R class
Processing data	<ul style="list-style-type: none"> • Geo-referencing • Country codes • Projections (changing) • Changing scale / zooming in • Exporting data into EXCEL
Analysis	<ul style="list-style-type: none"> • Correlations (spatial, temporal) • Multivariate analyses (R forge site on this) • Standard deviations • Regressions • Subsetting 4 d datasets • Comparing maps (mget Duke, GRASP, open modeler) – space, time, significance • Interactive maps – pulling data off plots • Change of support (point source to gridded data) always introduces error Gotway & Yang Journal of American Statistical



	<p>Association 2002 “Incompatible spatial ...”</p> <ul style="list-style-type: none">• Error propagation• Uncertainty - how to calculate
Plotting	<ul style="list-style-type: none">• Multiple plots• Making smooth plots (see SURFER)• Colours Rcolorbrewer, Fields (NCAR package)• Ross Ihaka Colour Me...carefully• Maps• Subsetting data by country, biome, population ...• QQ plots• Plotting composite index• Taylor, target graph, multi-axes graphes• Uncertainty - how to represent?• Cartograms• Interactive features (SVG)• Linked threshold graphs• Maps with overlaid histograms/QQ• Representing more than one data at a given pixel• Drawing arrows/paths on maps
Archiving	<ul style="list-style-type: none">• Sourceforge• Rforge
Documentation	<ul style="list-style-type: none">• Sweave• Quality assurance checklist (check your projection ...)