

## DIGITAL GEOLOGICAL MAPPING AT THE BRITISH GEOLOGICAL SURVEY: THE “SIGMA MOBILE” SYSTEM

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Since about 2000, a team at the British Geological Survey (BGS) has developed a digital geological mapping system, called “SIGMA *mobile*”. The system comes as an add-on to ARC-GIS software and uses a customised MS Access database. It is simple to use, intuitive and only requires fairly basic ARC-GIS and MS Access skills. The current version runs with ARC-GIS versions 9.2 to 10. At BGS, SIGMA *mobile* is run in the field on a physically robust, watertight *Xplore* tablet computer with a 10.4” screen, 1.2 GHz processor and a 40 Gb hard drive. The computer has a built-in GPS which continuously tracks and updates its position and shows the current location on the screen, superimposed on whatever data layer is visible (e.g. topographic map, historic geological map, satellite image etc). The computer comes with a small USB mouse and keyboard, but in the field a digital touch-screen stylus is used for data entry. Text can be entered freehand (intelligent handwriting recognition), or by touching a virtual on-screen keyboard. An open-source version of SIGMA *mobile* is available for download free from the BGS website ([www.bgs.ac.uk](http://www.bgs.ac.uk))

SIGMA *mobile* is operated by two simple toolbars added to the normal ARC-GIS array: one for data entry and line-drawing, the other to control the GPS (Fig. 1). The main toolbar allows easy entry of all field data, which are stored on a customised MS Access database. Entry of a data observation point is achieved by positioning the cursor above the shown GPS location, or anywhere else required, and touching the screen using the green flag icon on the main toolbar. This brings up a primary data screen which has a number of fields. These include areas for free text (e.g. for descriptions), numerical data (e.g. structural measurements) and drop-down menus (e.g. rock-types). The system has a large number of specialist fields (e.g. karst and glacial features, landslides, core and section logs etc.) which can be used or ignored as required. No fields are obligatory. The primary data entry page has the facility for sample entry, downloading and archiving photographs and a sketch tool which can be used to draw freehand sketches and annotate downloaded photographs etc. Numerical data, such as structural measurements can be instantly displayed on screen, in the correct orientation. A separate “Map Face Note” tool allows text labels to be added, arrowed to specific features and locations, as required, similar to written notes on paper geological field slips. Observation points are added in sequential numerical order and all data fields can easily be edited at any stage (red flag icon). Digital photographs can be downloaded directly from a camera in the field, or at any stage thereafter. A précis tool gives a quick view on one screen of all stored data for any particular observation point.

Geological lines (stored in a “geoline” shapefile) can be drawn/digitised using a very simple line-drawing tool, operated by the stylus or a mouse, with a number of line-types available, each with the usual array of line thicknesses and colours as standard in ARC. The drawing tools give an editing capacity that is similar to, but easier to use than that in ARC. Closed lines can be converted to polygons, seeded, coded and legends drawn etc., according to normal ARC procedures. The SIGMA *mobile* system will be demonstrated with examples from recent projects in the United Arab Emirates (“soft-rock” geology) and Tanzania (basement).

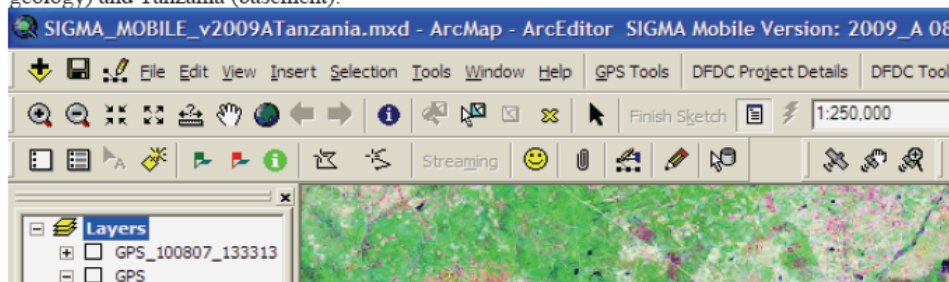


Fig. 1 View of the SIGMA *mobile* toolbars (lowermost bar) within ARC-GIS version 9.3. The lower left bar operates the SIGMA *mobile* functions, while the small bar on the lower right operates the GPS.