SESSION 4
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DIGITAL GEOLOGICAL MAPPING AT THE BRITISH GEOLOGICAL SURVEY WITH THE SIGMA SYSTEM: EXAMPLES FROM THE UNITED ARAB EMIRATES AND TANZANIA

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Over the last few years, a team at BGS has developed a digital geological mapping system, called “SIGMAmobile”, as an add-on to ARC-GIS software and using a customised MS Access database. The system is quite simple to use and intuitive and only requires fairly basic ARCGIS skills. The current version runs with ARC-GIS versions 9.2 or 10. The system runs on a physically robust, watertight *Xplore* tablet computer (10.4” screen; 1.2 GHz processor; 40 Gb hard drive). The computer has a built-in GPS which tracks its position and shows the current location on the screen, superimposed on whatever data layer is visible (e.g. topographic map, satellite image etc).

The computer comes with 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. SIGMA is free from the BGS website.

The system 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. The main toolbar allows easy entry of all field data, which are stored on an MS Access database. Entry of a data observation point (by positioning the cursor above the shown GPS location, or anywhere else required, and touching the screen) brings up a primary screen which has a number of data fields. These include areas for free text (e.g. for descriptions), numerical data (e.g. structural measurements) and drop-down menus (e.g. common rock-types). The system has a large number of specialist fields (e.g. karst features, landslides etc) which can be used or ignored as required (no fields are obligatory). The primary data entry page has the facility for sample entry, photograph downloading and archiving, 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, as required. Observation points are added in sequential order and all data fields can easily be edited at any stage. Data such as photographs can be downloaded directly from the camera in the field, or at any stage thereafter. A resumé tool gives a quick view of all stored data for a particular locality. Geological lines (stored in a “geoline” shapefile) can be drawn using a very simple line-drawing tool, operated by stylus or mouse, with a number of line-types available, with the usual array of thicknesses and colours as standard in ARC. Closed lines can be converted to polygons and legends drawn etc., according to normal ARC procedures.

In the talk, the SIGMA system will be demonstrated, with examples from recent projects in the United Arab Emirates (“soft-rock” geology) and Tanzania (basement mapping