**Project overview**

*Project name*: low permeability rocks in sub-Saharan Africa - Ghana.

*Project aim and brief synopsis*:

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| Water supply borehole drilling success rates (yields > 30 l/min) in Voltaian sedimentary rocks in Ghana are poor, at 18-40%. The location of and data from about 370 boreholes drilled in the Afram Plains have been collated into a database to enable assessment of the hydrogeological development potential of four of the five geological units present.  Two British Geological Survey (BGS) hydrogeologists supervised the installation and testing of 4 deep exploration boreholes and 6 production boreholes during April-May 2001. The data gathered during this drilling programme were used with information from the database to assess the groundwater resources of the Afram Plains. The BGS hydrogeologists worked with Afram Plains Development Organisation (APDO) and Technic-Eau staff and Legon University MSc  students during the drilling and testing programme.  Hydrogeological techniques were demonstrated to & discussed with APDO, university and consultant staff, including: the relationship of rock outcrops to  topographic features; the selection of drilling sites using geological, geomorphologic and  geophysical criteria; the use of simple test pumping methods, using bailers and low capacity  Whale pumps; the collection of rock and water samples during drilling and test pumping, and borehole design related to Community Water and Sanitation Division guidelines.  Outputs are: a manual covering how to drill, construct and develop boreholes in low permeability rock (report CR/01/168N); the main project report (CR/02/137N) and additional digital files containing: data on borehole construction, geological logs, test pumping details, water strike and borehole yield for previous boreholes drilled within the area collated by the project team; a literature review of the Afram Plains, and maps.  The project also included a similar case study in Tanzania (see separate project sheet), with additional ‘rapid assessments’ in Zambia and Ethiopia. |

*Country* : Ghana *Main Region(s)/ Town(s): Afram Plains*

*Project leader*:

*Project staff and main responsibility (including project partner details)*:

* Jeff Davies and Jude Cobbing (local contacts included in the report CR/02/137N)
* Afram Plains Development Organisation (APDO)
* Technic-Eau staff
* University of Ghana, Legon

*Length of project*: *From*: 1998 *To*: 2002

*Caveats on data use*:

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| All reports and data are open access. |

**Data collected**

**Chemistry data**

*Groundwater chemistry yes~~/no~~*

*Estimated number of sites*: 29 boreholes/wells. pH, SEC, Temperature, HCO3, Majors and trace elements; 12 samples δ18O and δ2H *Time series data: ~~yes/~~no*

*Surface water chemistry: ~~yes/~~no* *Estimated number of sites*: *Time series data: yes/no*

*Type(s) of surface water*:

*Precipitation chemistry: ~~yes/~~no* *Estimated number of sites*: *Time series data: yes/no*

*Other: eg waste waters, irrigation waters, soil samples*

*Please record here if the data was collected by BGS and/ or partners and who the partners were along with any restrictions for the use of the data*

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| All reports and data are open access. |

**Hydrogeological data**

*Boreholes drilled: yes~~/no~~* *Approximate number*: 10 *Approximate depths*:

*Waterlevel data: yes~~/no~~*  *Manual / automatic*: *Time series data: yes/no*

*Rainfall data*: *Manual / automatic*: *Time series data: yes/no*

*Falling/ rising head tests: yes/~~no~~ see report and associated data.*

*Aquifer properties data/ samples*: yes, see reports and associated data

*Other*

*Please record here if the data was collected by BGS and or partners and who the partners were along with any restrictions for the use of the data*

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| All reports and data are open access. |

**Geological data**

*Additional mapping done during the project: ~~yes/~~no*

*Classification of geological materials*: *~~yes/~~no*

*Please record here if the data was collected by BGS and or partners and who the partners were along with any restrictions for the use of the data*:

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**Data output**

*Reports:*

J Davies and J Cobbing, 2002. An assessment of the hydrogeology of the Afram Plains, Eastern Region, Ghana. British Geological Survey Internal Report, CR/02/137N. 66pp <http://nora.nerc.ac.uk/id/eprint/505607/1/CR_02_137N.pdf> *Additional data goes with this report.*

Davies, Jeffrey. 2002 Low permeability rocks in sub-Saharan Africa : visit to Ghana to disseminate project results, 16-23 March 2002. British Geological Survey, 38pp. (IR/02/062) <http://nora.nerc.ac.uk/id/eprint/12650/1/IR02062.pdf>

Davies, J. 2000 Monitoring the installation of a series of water supply boreholes: Afram Plains, Ghana. Nottingham, UK, British Geological Survey, 70pp. (WC/00/015) <http://nora.nerc.ac.uk/id/eprint/506809/1/WC00015.pdf>

Davies, J.; Cobbing, J.E.. 2001 Reconnaissance visit to assess the hydrogeology of the Oka area, Sekyere west district, Ashanti Region, Ghana. British Geological Survey, 17pp. (IR/01/153) (Unpublished) <http://nora.nerc.ac.uk/id/eprint/523816/1/IR01153.pdf>

MacDonald, A.M.; Davies, J.. 2000 A brief review of groundwater for rural water supply in sub-Saharan Africa. British Geological Survey, 30pp. (WC/00/033) (Unpublished) <http://nora.nerc.ac.uk/id/eprint/501047/1/SSA_review_lr.pdf>

*Manual:*

MACDONALD A M, DAVIES J AND Ó DOCHARTAIGH B É. 2002. Simple methods for assessing groundwater resources in low permeability areas of Africa. British Geological Survey Commissioned Report CR/01/168N <http://nora.nerc.ac.uk/id/eprint/501046/1/gw_manual_lr.pdf>

*Book section:*

Cobbing, Jude E.; Davies, Jeffrey. 2008 The benefits of a scientific approach to sustainable development of groundwater in Sub-Saharan Africa. In: Adelana, Segun M.A.; MacDonald, Alan, (eds.) Applied groundwater studies in Africa. London, UK, CRC Press, 85-101. (Selected papers on hydrogeology, 13). <http://nora.nerc.ac.uk/id/eprint/6222/>