CHRIS JOHNSON WORKING BIOGRAPHY

UNIVERSITY RESEARCHER

Dr Johnson graduated in 1976 from the University College of Wales Aberystwyth with a BSc (Joint Honours) in Geology and Chemistry. He stayed on in the Geology Department as a Junior Research Assistant where Dr Ron Fuge supervised his PhD awarded in 1980 for a thesis on '*The Geochemistry of Iodine and its Potential Use as a Pathfinder Element in Geochemical Exploration*'. This started a lifelong interest in the geochemistry of iodine and its role in human health.

Geology Department, UCW Aberystwyth

GEOCHEMIST ON THE INSTITUTE OF GEOLOGICAL SCIENCES (IGS) MINERAL RECONNAISSANCE PROGRAMME

The experience in geochemical exploration gave Dr Johnson the opportunity to work at the Institute of Geological Sciences (IGS) (later renamed British Geological Survey (BGS)) on the Mineral Reconnaissance Programme. As part of a multi-disciplinary team, he carried out regional and localised geochemical mapping involving the collection of thousands of samples (mainly soils and stream sediments), and the interpretation and reporting of the results. This also included follow-up work on geochemical and geophysical anomalies leading to the drilling of mineralised areas of the Whin Sill in Northern England.

During his first period (1979 -1983) at BGS Keyworth (near Nottingham, UK) Dr Johnson was also a tutor for the Open University Geochemistry Course and a teacher in geology at the Nottingham Adult Education Centre.

NORTHERN SUMATRA GEOCHEMICAL AND MINERAL EXPLORATION PROJECT (NSGMEP), BANDUNG, INDONESIA

In 1984 Dr Johnson moved with his family to Bandung, Indonesia on secondment to the Directorate of Mineral Resources (DMR), Ministry of Mines. This was funded by the British Overseas Development Administration (ODA) with the objective of building up an institutional capability in applied geochemistry as part of the drive to develop Indonesia's metalliferous minerals sector. The NSGMEP (1984-1989) investigated some of the geochemical anomalies identified by the initial BGS 'North Sumatra Project (NSP)'. This involved many long periods of fieldwork in the jungle of northern Sumatra often accessing remote areas on foot camping for many weeks at a time. Dr Johnson also had the role of overseeing the geochemistry laboratories and was involved in developing the emerging desktop computer technology for data interpretation and report writing.

DMR office in Bandung was adjacent to the Geological Museum

SOUTHERN SUMATRA GEOLOGICAL AND MINERAL EXPLORATION PROJECT (SSGMEP), BANDUNG, INDONESIA

AAS machine, DMR Laboratory

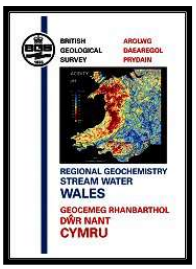
Between 1989-1994 he worked with DMR and the Geological Research and Development Centre (GRDC) on the SSGMEP to complete the geological and geochemical mapping of southern Sumatra. On completion of this project geochemical maps were available for the whole island of Sumatra. Dr Johnson's work in Sumatra gave him experience of working in a multi-disciplinary team geologists, supervising the work of a large number of counterpart geochemists and supporting services such as computer and analytical laboratories.

Panning, S Sumatra

In Indonesia Dr Johnson developed an interest in emerging desktop computers learning numerous software applications and developing his own software for data interpretation and mapping. In Sumatra he learnt by practical experience the value of data quality control and assurance. On returning to the UK, Dr Johnson created a CD-ROM of the Sumatra geochemical data and a digital geochemical atlas for southern Sumatra, BGS's first saleable CD-ROM. He also went onto to develop a series of international geochemical data CD-ROMs to ensure BGS's ODA work on geochemical mapping around the world was made readily available.

GEOCHEMIST, BRITISH GEOLOGICAL SURVEY, NOTTINGHAM, UK

On returning to BGS in 1994, Dr Johnson worked with the UK regional mapping programme (G-BASE). This high resolution geochemical survey using stream sediments and waters was driven in the early year by Dr Jane Plant, principally targeting mineral exploration. By the time of its completion in 2014 it represents one of the most comprehensive national geochemical mapping programmes ever completed with a wide range of applications. Dr Johnson was the G-BASE project manager from 2002-2013 (with a break 2009-2011 when he was the BGS Head of Science for Environmental Geoscience Baselines). BGS data was maintained in the BGS Geochemical Database and Dr Johnson was the manager of this database 2002-2009.



One of G-BASE's many regional atlases

GEOCHEMISTRY AND HUMAN HEALTH PROJECTS

With a background in research into iodine geochemistry Dr Johnson has maintained an interest in geochemistry and health throughout his career. Between 1995-1998 he worked on a project '*Prediction and remediation of human selenium imbalances*' which was funded by the UK Department for International Development (DFID) and involved studies of selenium distribution in the environment and human population in areas of China and Sri Lanka. A further project 1999-2002 funded by DFID - Environmental Controls in Iodine deficiency Disorders – put Dr Johnson's expertise in iodine geochemistry to good use. Case studies were carried out in Morocco and China, geochemists working with medical doctors.

IDD studies in China with Dr Alex Stewart

In 2013 Dr Johnson led a project looking at how the Tellus Border geochemical data (Ireland) could be utilised in agriculture.

INTERNATIONAL REGIONAL GEOCHEMICAL MAPPING PROJECTS

Dr Johnson continued his international involvement in large regional geochemical mapping projects in Morocco (1998-2000), Madagascar (2005), and Nigeria (2007-2010). All these projects had substantial institutional building and training components and with these projects Dr Johnson continued to develop his expertise in geochemical data management, interpretation and reporting.

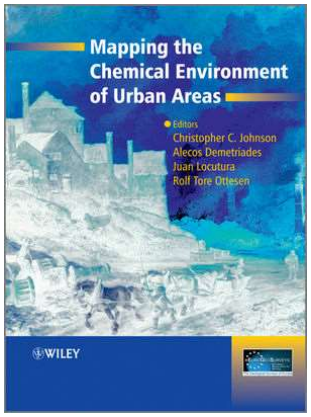
Training students, Madagascar

As project manager, Dr Johnson led a team of BGS geochemists drainage sampling in the semi-arid region of the Anti-Atlas Mountains in the region of Ouarzazate, Morocco. Samples were collected at a density of 1 per 1 km^2 over a period of 6 months. Dr Johnson initiated the Madagascar regional geochemistry programme by training students and geologists how to collect and organise and geochemical sampling programme.

He was project manager for the World Bank funded 'Nigeria Geochemical Mapping Technical Assistance Project' (NGMTAP) which worked with the Nigerian Geological Survey Agency to map to areas of Nigeria (around Minna and SW Nigeria) using drainage sampling. This was a project to help develop Nigeria's non-hydrocarbon minerals sector and much of the work was concerned with training and institution building.

GEOCHEMICAL MAPPING OF URBAN AREAS

In the 1990s, when the G-BASE project became more environmentally orientated and included the mapping urban areas, Dr Johnson developed an expertise in the geochemistry of urban environments. Working with colleagues from the EuroGeosurveys' Geochemistry Group he was the lead editor on a book – Mapping the chemical environment of Urban Areas published in 2011.



The BGS was commissioned by the UK Department for Environment Food and Rural Affairs (Defra, October 2011–March 2012) to give guidance on what are normal levels of contaminants in English soils in support of the revision of the Part 2A Contaminated Land Statutory Guidance. Dr Johnson managed the Normal Background Concentration (NBC) Project which was an excellent example how baseline geochemical data could be employed to help better inform legislation on contaminants in the environment.

Dr Johnson retired from BGS in June 2013 but has continued to write and edit publications in geochemistry. Under the business name 'GeoElementary' Dr Johnson now provides services to environmental and exploration geochemistry. He has had several periods of work as an associate to IGS Ltd. In Sierra Leone and most recently in Saudi Arabia.

Many of Dr Johnson's publications can be found in NORA or listed in ResearchGate.

ONGOING PROJECTS

1. Technical Partner to Saudi Geological Survey (SGS) for Geochemical Survey Arabian Shield Project (GSASP). Team Leader Geochemistry/consultant to IGS Ltd. (*June 2021 – now*).
2. Scanning old ODA geochemistry technical reports from Indonesia and loading to ResearchGate as pdf so this large body of work from Sumatra is available to all (*ongoing*).
3. Editing and contributing to the IUGS Standard Methods Manual for geochemical mapping (*ongoing*).

RECENT PUBLICATIONS

Demetriades, A., Dai, H., Liu, K., Savin, I., Birke, M., Johnson, C.C., Argyraki, A. (Editors), 2020. *International Union of Geological Sciences Manual of Standard Geochemical Methods for the Global Black Soil Project*. International Union of Geological Sciences, Commission on Global Geochemical Baselines, Special Publication No. 1, Athens, Hellas, 107 pages, 49 figures, 4 Tables, and 4 Appendices.

JOHNSON, C.C., Flight, D.M.A., Ander, E.L., Lister, T.R. and four others. 2018. The collection of drainage samples for environmental analyses from active stream channels. Chapter 4, 47-77 in: Environmental Geochemistry. Site Characterization, Data Analysis and Case Histories. De Vivo, B., Belkin, H.E. and Lima, A. (editors). 2nd Edition. Elsevier. ISBN 978-0-444-63763-5.

JOHNSON, C.C., Ander, E.L., Lister, T.R. and Flight, D.M.A. 2018. Data conditioning of environmental geochemical data: quality control procedures used in the British Geological Survey's regional geochemical mapping project. Chapter 5, 79-113 in: Environmental Geochemistry. Site Characterization, Data Analysis and Case Histories. De Vivo, B., Belkin, H.E. and Lima, A. (editors). 2nd Edition. Elsevier. ISBN 978-0-444-63763-5.