

Development of a Global Plate Tectonic Reconstruction Application for ArcGIS

Bridget Ady & Richard Whittaker
GeoArctic Ltd
www.geoarctic.com

GeoArctic Ltd has developed a state-of-the-art geological application for ArcGIS 9 that incorporates a unique deformable plates technology for plate reconstructions. The *Plate Wizard* software provides the capability to reconstruct detailed geological data of any type for both convergent and divergent plate margins. These data are rotated and deformed in a GIS environment to their original geographic location for any period in the geological past, removing the common problems of plate overlap and under-fit. *Plate Wizard* represents a major advance over the rigid plate models that are available so far.

Plate Wizard builds on plate reconstruction and deformation software originally developed by GeoArctic for ArcView 3 in 1999. Since that time the software has been ported to ArcObjects and has now been fully incorporated as a custom toolbar for ArcMap 9. In 2007 Fugro-Robertson Ltd, a geological consulting company based in the UK, chose to use the software for a major global plate reconstruction project. GeoArctic has an ongoing development program, in partnership with Fugro-Robertson, leading to delivery of an entirely new integrated plate reconstruction application and associated global plate model.

GeoArctic has a long history of applying GIS plate reconstruction technology to oil and gas exploration, and their consultants have developed methods and techniques that have been successfully applied to frontier exploration. We use all available regional and detailed geological and geophysical data to build a detailed structural and paleogeographic history of a plate margin. Whereas plate reconstructions are generally only used to provide a regional overview of the geological setting, we can now use GIS analysis to determine detailed information on the structural development of a basin, the depositional setting and provenance of reservoir rocks, source rock distribution, and even paleo-climate and ocean currents.

Bridget Ady MSc (bady@geoarctic.com)

Bridget Ady has an MSc in Geology from the University of Toronto. She has been an active participant in the geospatial technology industry for over twenty years and has vast experience in the design and development of environmental and geological geospatial applications worldwide. She worked for a number of years for the Ontario Geological Survey where she was technical manager for the design and implementation of the pioneering Earth Resources and land Information System (ERLIS). This was followed by several years as a consultant, which included work for the United Nations Development Program and the Geological Survey of Greenland. In 1994 she joined ESRI's environmental consulting group in Redlands, California where she managed projects for clients that included the Venezuelan State Oil company, PDVSA and the National Oceanic and Atmospheric Administration (NOAA). In 1996 she co-founded GeoArctic, and is now devoted to the development of exciting new applications for regional and global tectonic, paleogeographic and climate studies and to the continued dissemination of geospatial environmental data to the petroleum and mining industries.

Richard Whittaker MSc. P.Geol (rwhittaker@geoarctic.com)

Richard Whittaker has been a Senior Consultant and Managing Partner at GeoArctic since 1996. He has an MSc in Geology from Imperial College at the University of London in 1984. After graduating, he worked as an exploration geologist and seismic interpreter in London and his experience included being Senior Geologist for Enterprise Oil's international new ventures group. He then moved to Scandinavia, where he worked as a consultant geologist for Norsk Hydro in their research centre in Bergen, and for Nunaoil and the Geological Survey of Greenland in Copenhagen. Since 1996 he has been a managing partner at GeoArctic, specializing in the geological application of GIS technology, and has driven the development of GeoArctic's plate reconstruction software. He has consulted on numerous plate

reconstruction projects on the Atlantic margins, the Arctic, a SE Asia, the Labrador Sea and Baffin Bay, Northern and Eastern Canada, SE Asia, and a global plate reconstruction/ source rock study. Clients have included Norsk Hydro (Oslo, Bergen and Calgary), Petro-Canada, EnCana, Shell, Husky, Nunaoil and GEDCO. At GeoArctic, he has also managed numerous large GIS projects which have included geological and environmental database applications, 3D geological visualization using GIS, and was senior consultant on a major salinity/ice analysis of Hudson Bay for the Government of Nunavut.