Ethical impacts of AI upon the science of a national geological survey

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AI is rapidly changing how geoscientific research is undertaken. AI allows multiple data streams to be captured, processed and integrated so it can be analysed using newly available techniques all at unprecedented speed and scale. Like all scientific institutes National Geological Survey Organisations (GSO) wish to take advantage of such new capabilities. However, the role of GSO in providing data and research outcomes to support national government policy, in often controversial situations, means prioritising research that can be accurately reproduced and defended through peer-review. GSO research must be undertaken ethically in ways that respects the rights and responsibilities of the data owners and stakeholders, direct and indirect, affected by that research.

The software houses that have built many widely available AI tools, especially Large Language Models (LLM) have often not obeyed such ethical constraints, misusing private intellectual property, and prioritising generating an answer to the detriment of delivering accurate outputs. The difficulties in using generative AI to deliver reproducible science outputs that are traceable to source data are the consequence of choices around AI techniques, rather than features of these techniques. Such approaches are unacceptable to GSO.

This paper describes efforts by the British Geological Survey, the UK GSO, to define an ethical framework in which geological science can be conducted using AI capabilities. Examples include how a GSO can operate in ways that respect the rights of IPR holders and handling of privileged information that is held confidentially. Also how scientific data can be used to support policy advice for national governments, and in forecasting of implicitly uncertain geohazards where the requirement to highlight potential hazards conflicts with the desire not to cause needless alarm.