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Application of high-performance computing at the Council for Geoscience

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The Council for Geoscience (CGS) is mandated to develop and publish world-class geoscience knowledge products and to render geoscience-related services to the South African public and industry. In order for the CGS to fulfil this mandate and to advance the geoscience field within South Africa and beyond, the organisation is utilising high-performing computation resources provided by the Department of Science and Innovation, Centre for High-Performance Computing (CHPC). Application of High-performing computation is part of the geoscience innovation initiative which is meant to address some of the societal challenges the world is facing. The paper highlights the concept, history, present and future of geoscience innovation. High-computing resources are being used in geophysics, particularly in airborne electromagnetic and magnetotelluric data inversion and also for seismological data processing. Geophysics is a science which uses physical measurements to understand the behaviour of the Earth. This is done by making massive observation datasets and large-scale computer simulations to improve our knowledge of the Earth. Most of the research projects involve computer-intensive processing and inversion of terabyte-scale geophysical data recorded by millions of recording points. This often requires parallel architectures such as the one at CHPC.

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