

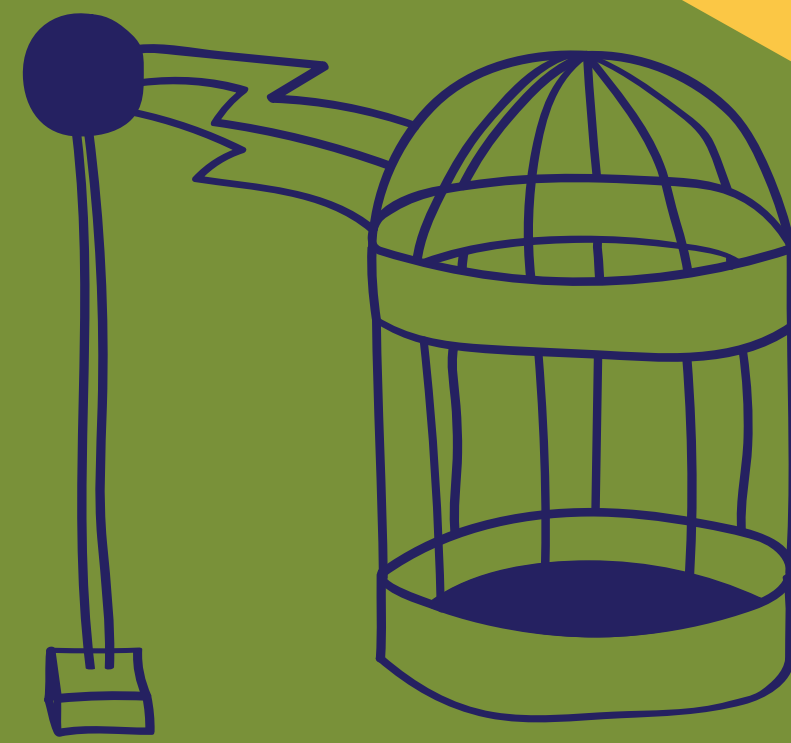
Electromagnetism

Study of materials and structures in the Earth using electromagnetic signals



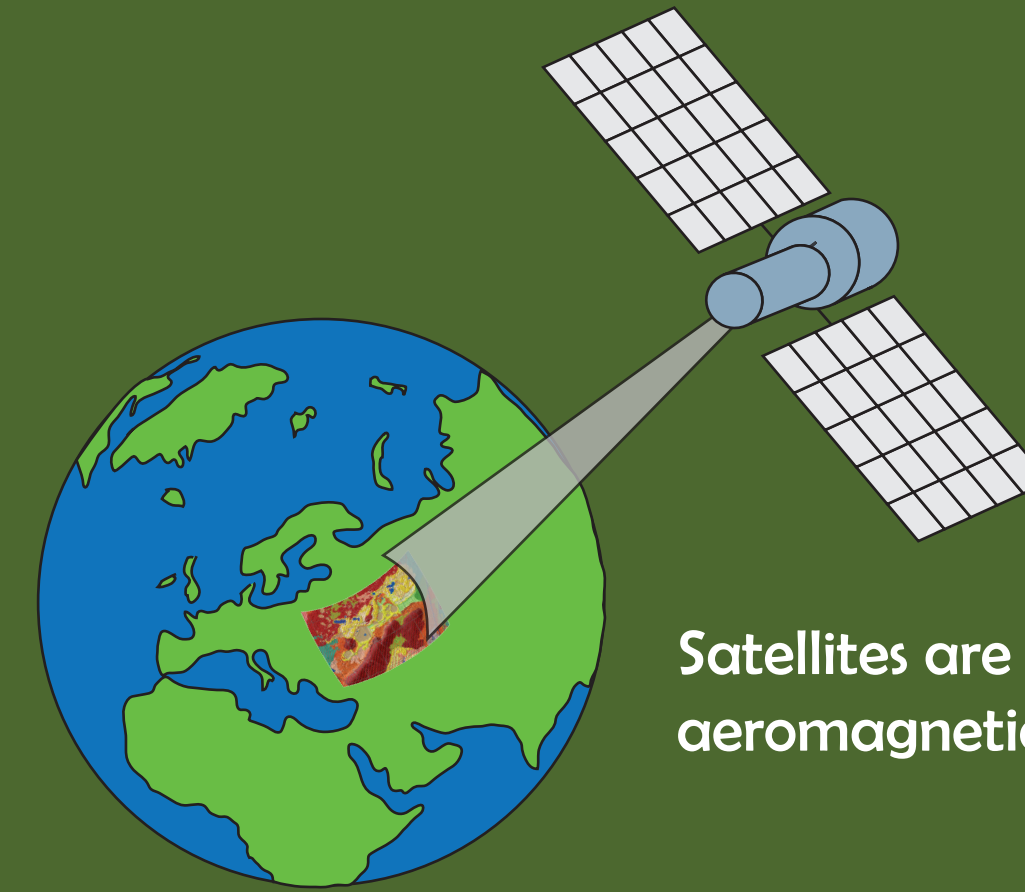
Michael Faraday

Michael Faraday and James Maxwell laid the foundations for the field of electromagnetism, by discovering the relationship between electric currents and magnetic fields. Faraday's cage protects against electromagnetic fields.

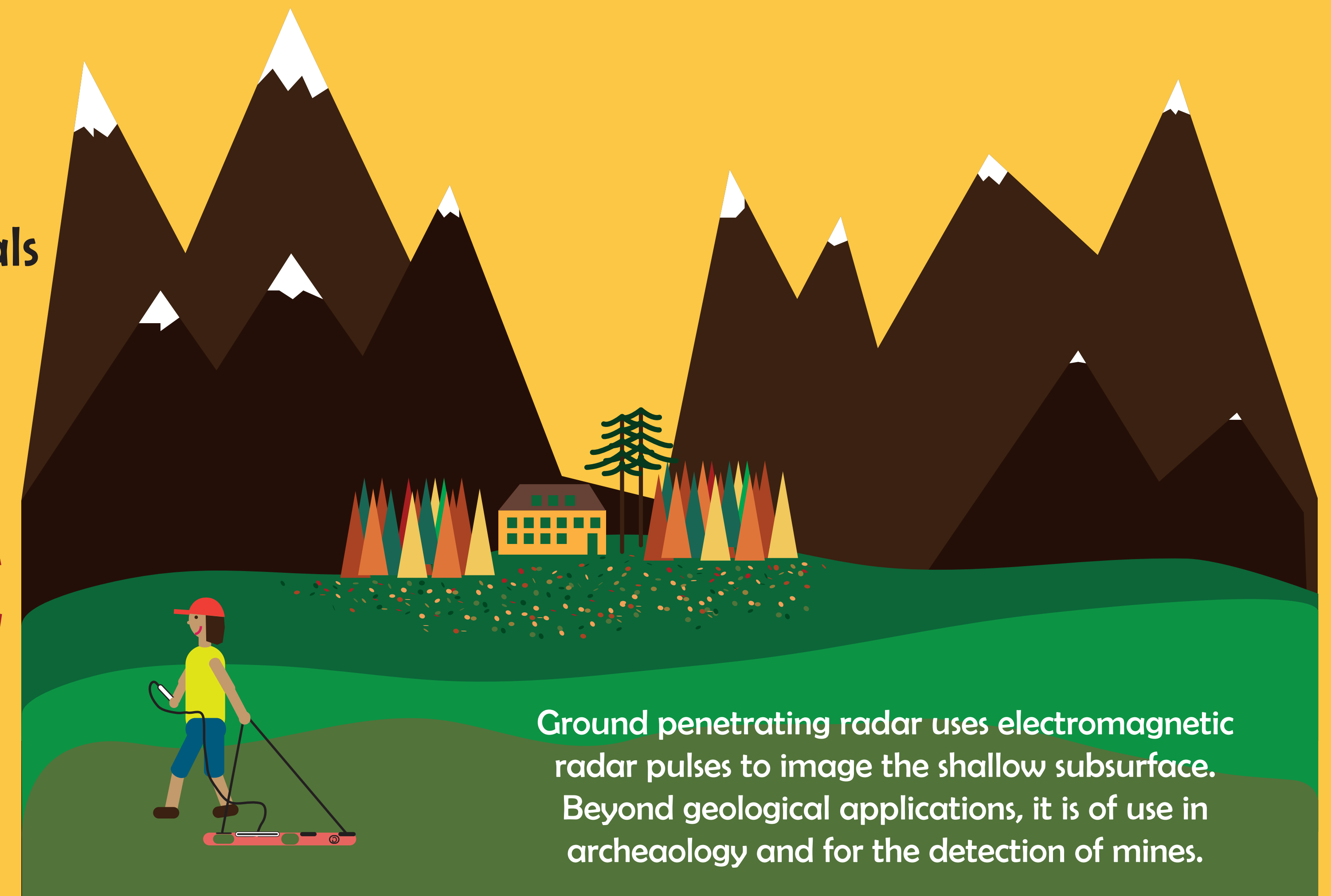


ELECTROMAGNETISM
TRAILHEAD

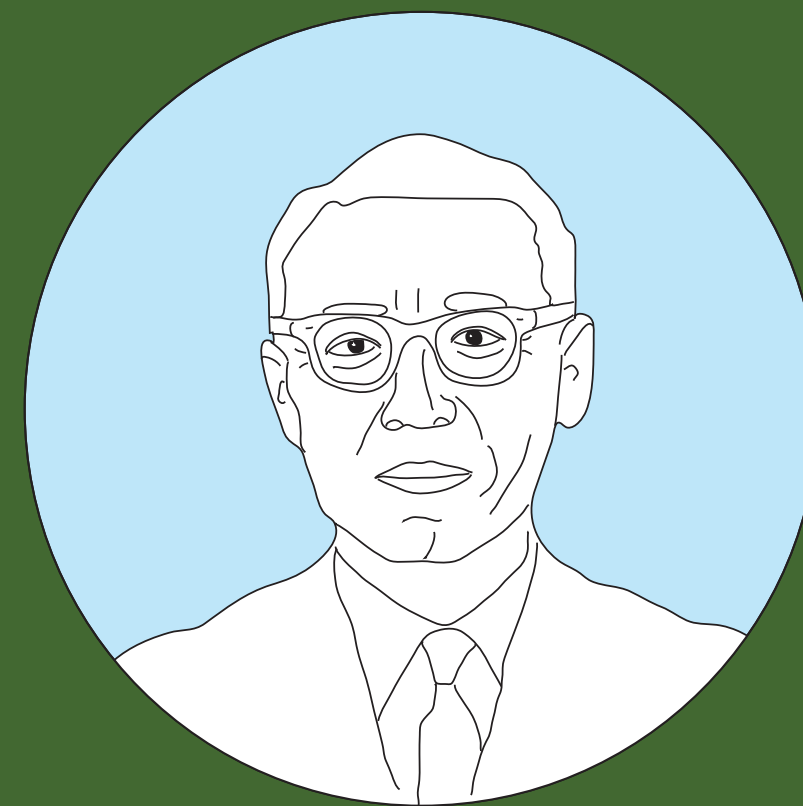
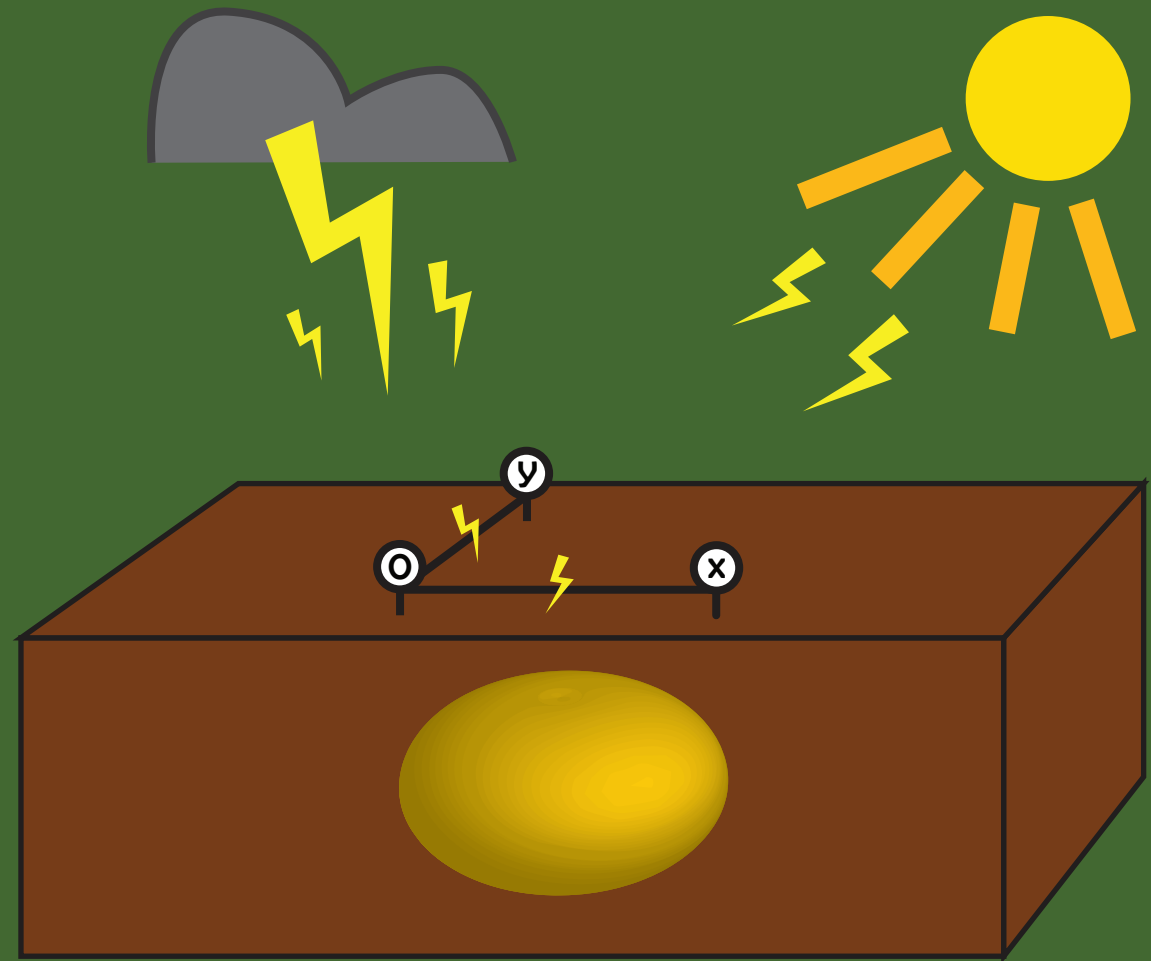
Earth-observing satellites continuously monitor the Earth's surface. Their sensors are tuned to specific bands in the spectrum of electromagnetic radiation to gather information on, for example, our climate, land use, and pollution.



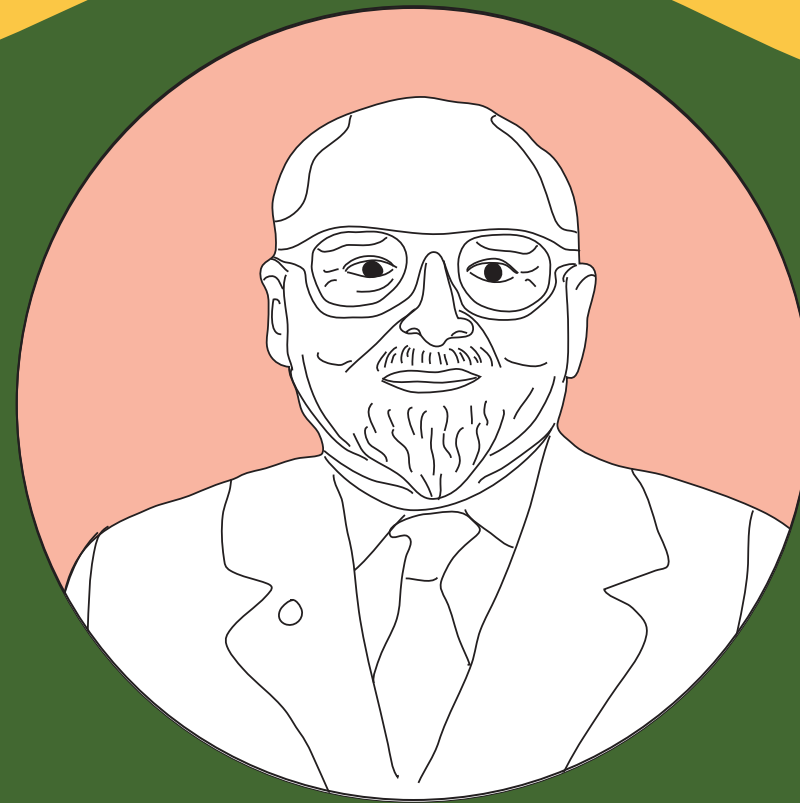
Satellites are used for aeromagnetic mapping



Ground penetrating radar uses electromagnetic radar pulses to image the shallow subsurface. Beyond geological applications, it is of use in archaeology and for the detection of mines.



Tsuneji Rikitake



Andrey Tikhonov



Louis Cagniard

Tsuneji Rikitake, Andrey Tikhonov and Louis Cagniard simultaneously developed magnetotellurics. Magnetotellurics is the study of electrical conductivity of the subsurface using natural electromagnetic signals, such as those arising from thunderstorms and variations in the Sun's radiation. Different rocks, sediments and geological structures have different conductivities, and the subsurface can be imaged by measuring electrical resistivity.



Arthur Schuster



Sydney Chapman

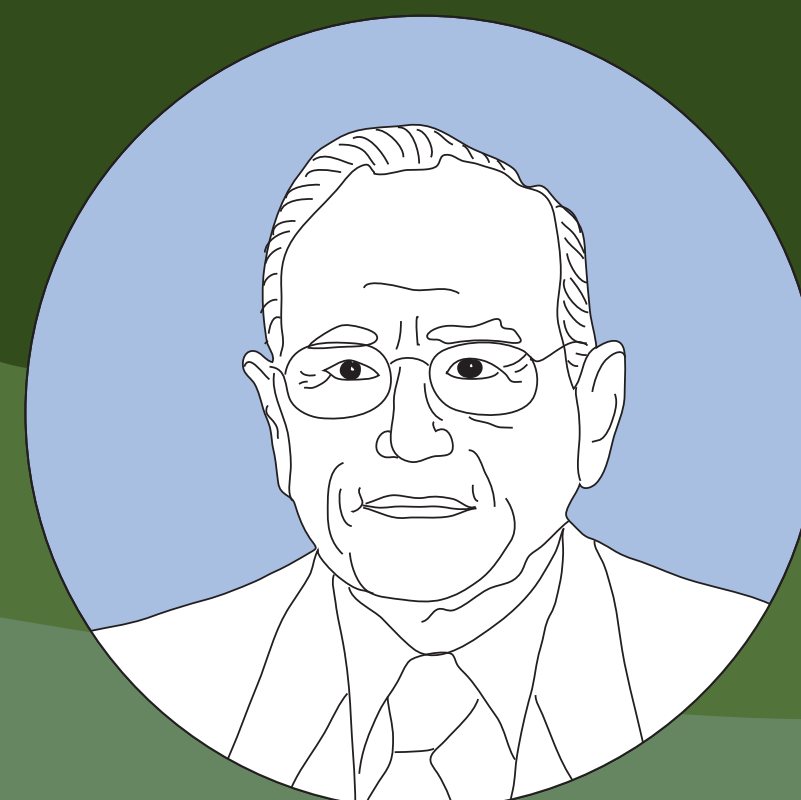
Arthur Schuster and Sydney Chapman pioneered and refined the geomagnetic deep sounding technique. Geomagnetic deep sounding uses electromagnetic induction to determine the conductivity of the subsurface. It differs from magnetotellurics in that it only uses the magnetic field, and not the electric field.



Rosemary Hutton

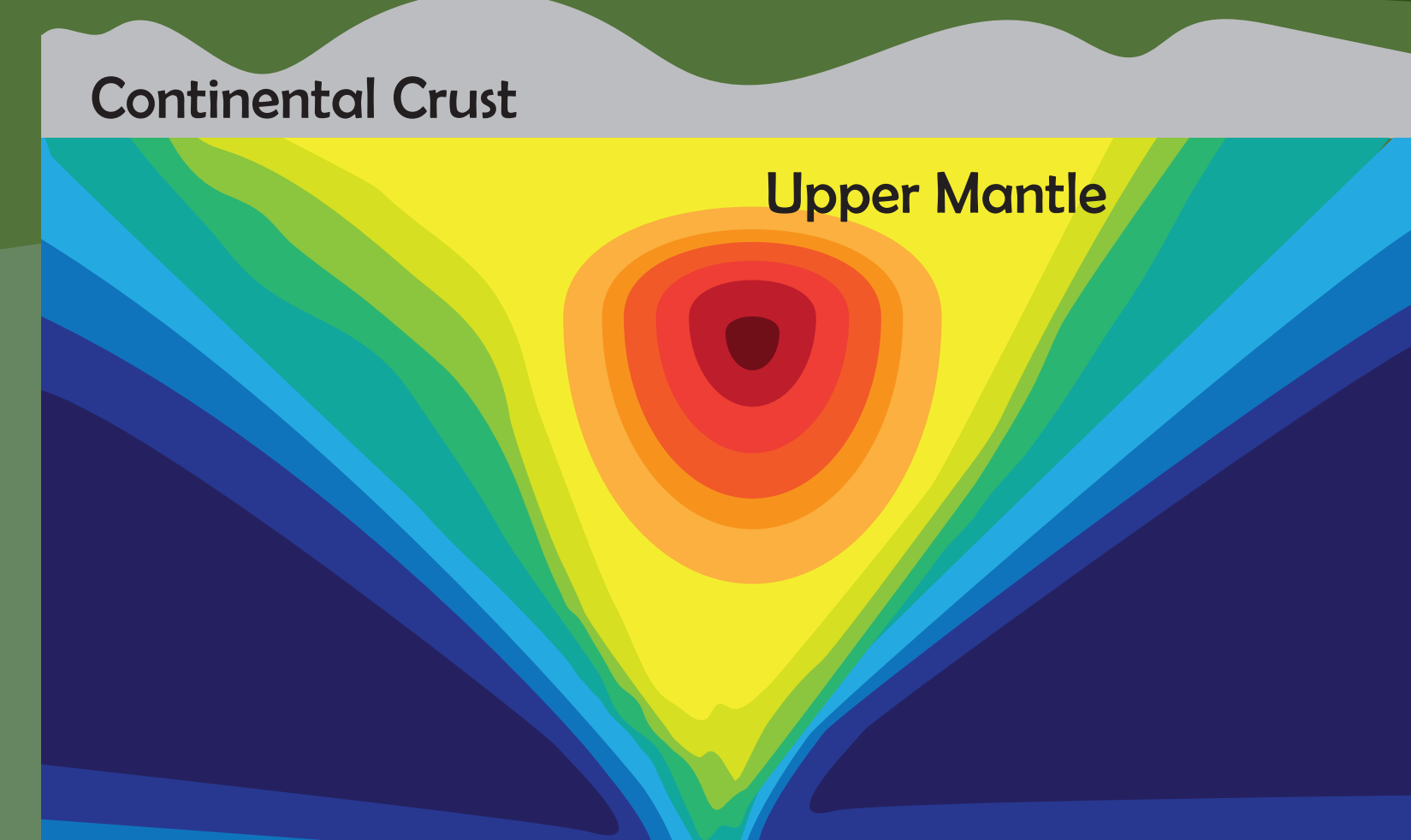


Mark Berdichevsky



Keeva Vozoff

Rosemary Hutton, Mark Berdichevsky and Keeva Vozoff developed methods and instrumentation for investigating the structure of the continental crust and upper mantle, using magnetotellurics.



resistivity (Ωm)
 10^6
 10^3
 10^0



Ulrich Schmucker

Ulrich Schmucker and Ian Gough developed geomagnetic deep sounding techniques to perform more detailed studies of regional variations in the crust and mantle in the 1970s.



Ian Gough