



## Deep Earth - from crust to core

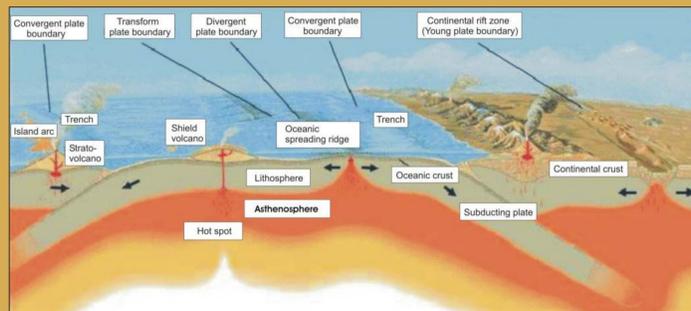
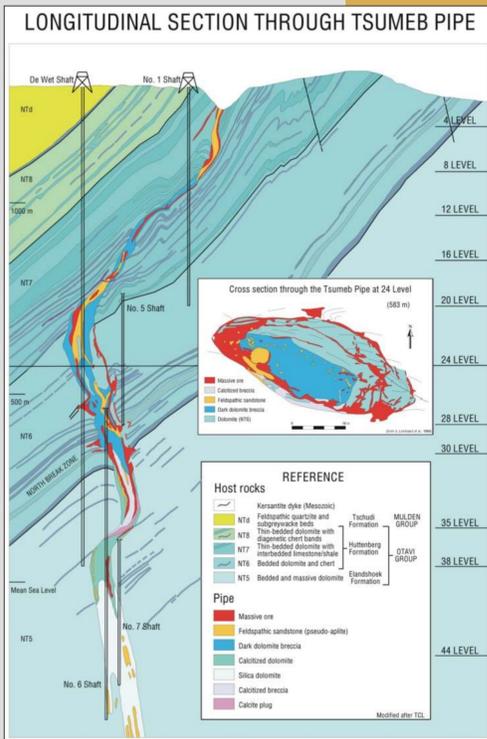
Internal forces within the Earth created the mountains of the Damara Fold Belt in central and northwestern Namibia (below), as well as great fracture zones in the Earth's crust like the Excelsior Shear Zone of southern Namibia (right)



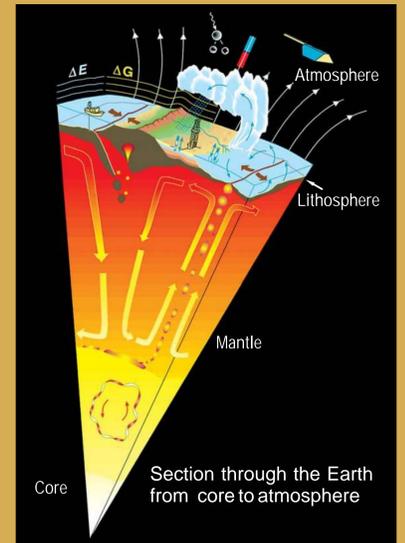
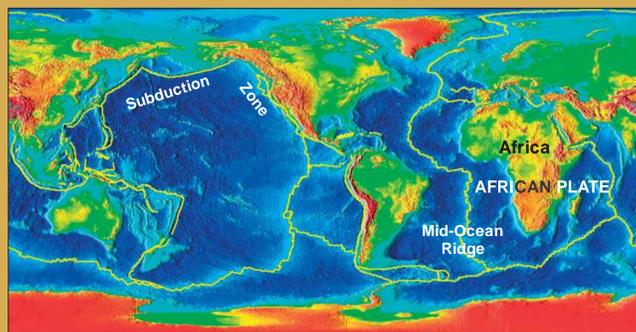
During the last few decades, Earth sciences have evolved rapidly and are now able to produce scientific models that can help to reconstruct and forecast the past and future processes of the solid Earth.

This includes forecasting the future behaviour of geological systems, and also the prediction of future geological patterns. The structure and processes of the deep Earth may sound remote from everyday concerns, but both have strong relevance for humanity's basic needs, such as supply of water and resources, protection against natural hazards, and control of the environmental degradation of the Earth.

The deep Earth seems remote from everyday concerns, but it has strong relevance for humanity



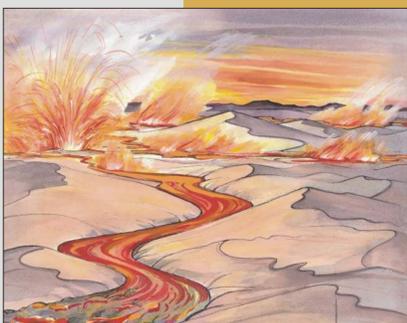
Earthquakes and volcanic eruptions occur preferably along suture zones within the Earth's crust and over "hot spots", where the crust is only thin and molten mantle material comes close to the surface (above). The continents are sitting on pieces of solid crust, called "lithospheric plates", which in turn are riding on the molten mantle (below). At the mid-ocean ridges new crust is being generated, while in subduction zones crust is absorbed back into the mantle



The Tsumeb Pipe, a base and rare metal deposit of world-renown, has been the subject of many economic and scientific studies... for the research of known ore bodies - their structure and their origin - helps to discover new ones to meet an increasing demand for raw materials



The huge lava fields of the Etendeka Plateau (above) are evidence of the tremendous forces that some 180 million years ago caused Africa and South America to drift apart (artist's impression of Etendeka volcanism by C. Marais, below)



The understanding of geologic processes within the Earth as well as on its surface has been essential in the discovery of most new mineral deposits in recent years, and also continues to be important in the search for groundwater - in an arid country like Namibia as valuable as gold! Moreover, knowledge of what "makes our planet tick" can help significantly to protect both human life and property from its sometimes destructive forces. While there is still very little we can do to prevent, for instance, an earthquake, sophisticated instruments nowadays are capable of measuring factors like heat flow and shock waves, and thus in many cases can give timely warning of an impending natural disaster. Of increasing importance is also to understand the influence of human activities on Earth's natural cycle of erosion and deposition as it has operated for billions of years.

Although present-day Namibia is removed from known centres of volcanic and/or seismic activity, it could still be affected by events that take place thousands of kilometres away. For instance, it has been speculated that the famous "Finger of God" near Asab - weakened by erosion - finally toppled over as a result of an earthquake whose epicentre was located in Turkey, more than 7000 km distant.



While earthquakes and volcanic eruptions originate deep within the Earth, erosion is a process which takes place at its surface. Where a river eats its way through underlying rock layers over hundreds of thousands of years, gorges like the Fish River Canyon (above) are formed that can easily be seen from space (below)



Satellite image of the Fish River Canyon