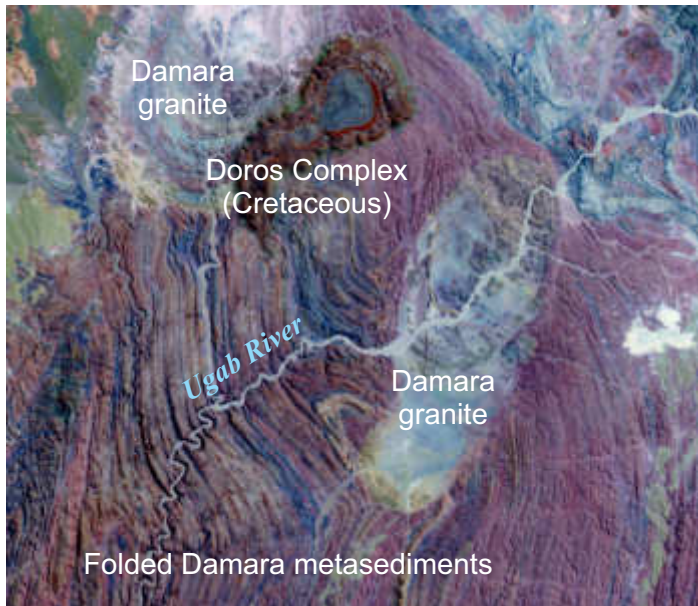




DAMARA OROGEN

The metasedimentary rocks and granites of the Damara Orogen - a fold belt which extends across northern Namibia between the ancient landmasses of the Congo and Kalahari Cratons - illustrate the immense forces that over millions of years shaped the face of planet Earth. According to the theory of plate tectonics, the crust, which represents the uppermost layer of the Earth's inner structure, consists of thick lithospheric plates "swimming" on the liquid mantle. If two plates - together with the continents riding on them - move away from each other, molten rock from the interior erupts onto the surface, while sediments from the erosion of continents accumulate in the resulting rift; if the movement is reversed, plates collide and the sediments deposited in the rifts or grabens are deformed into mighty mountain ranges under enormous temperatures and pressures. At the same time rocks within the tortured crust are being molten and the resultant liquid magma ascends to be emplaced again at higher levels as granitic intrusions. In this dramatic manner the Damara Orogen originated - a process which from the early rifting stage up to continental collision lasted about 300 million years (~850 to 550 m. y.). Younger examples are the Alps of Europe and the Rocky Mountains of North America.



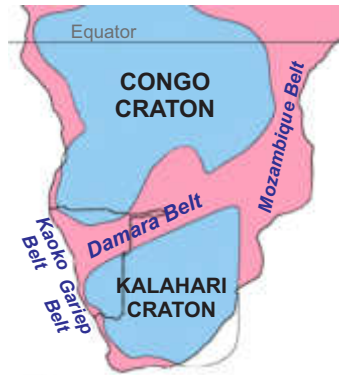
Satellite image of Damara sedimentary rocks and granites along the lower Ugab River

Composition and texture of the Damara sedimentary rocks show that they originated in a cold to temperate climate. "Normal" sedimentation was interrupted some 720 and again 635 million years ago by two global ice ages ("Snowball Earth"), when huge glaciers covered the land. Upon their eventual retreat, when temperatures increased once more, characteristic deposits of glacial debris formed that allow a correlation of rock units not only between different parts of the Damara Orogen, but also worldwide.



Glacial debris (diamictite, Ghaub Formation) Otavi Mountainland

During the collision phase sediments and intrusive rocks were subjected to varying temperatures and pressures across the affected area, which led to the formation of very different rock types with distinct characteristics. Accordingly the Damara Orogen contains high-grade metamorphic and intensely deformed gneisses (Central Zone) as well as only gently folded limestones and shales in the marginal areas.

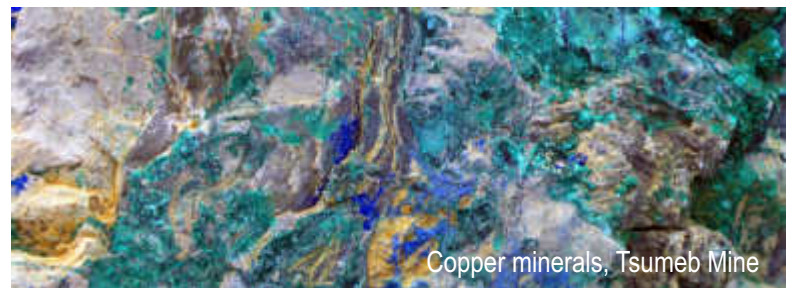


Cratons (blue) and fold belts (pink) of southern Africa



Folded Damara rocks (marble and schist) along the Ugab River

Complex interactions between sediments, magma and hydrothermal solutions caused the development of mineralized zones during as well as after the orogenic processes. Well-known examples are the rich base metal deposits of the Otavi Mountainland and the mostly pegmatite-hosted tin- and semi-precious stone occurrences between Karibib, Uis and Swakopmund.



Copper minerals, Tsumeb Mine