

# The Petrified Forest of Khorixas (Namibia)

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*Many places in Namibia yield silicified wood, mainly of Lower Permian age. A few younger occurrences up to the Tertiary are also known. However, the Petrified Forest of Khorixas is by far the most extensive occurrence of large silicified tree logs in southern Africa and therefore a declared National Monument of Namibia.*

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## Directions and rules for visitors

The Petrified Forest National Monument is located directly at C39, 44.5 km west of Khorixas in the administrative region of Kunene. Approaching from the east via D2612 from Twyfelfontein, one reaches the entrance after 29.5 km on C39. Coordinates: 20°26'22.51" S, 14°36'21.87" E. The fenced area of the National Monument can only be visited with an official guide who is available on site. Collecting or removal of petrified wood is forbidden by law, violations are subject to both a fine and imprisonment.

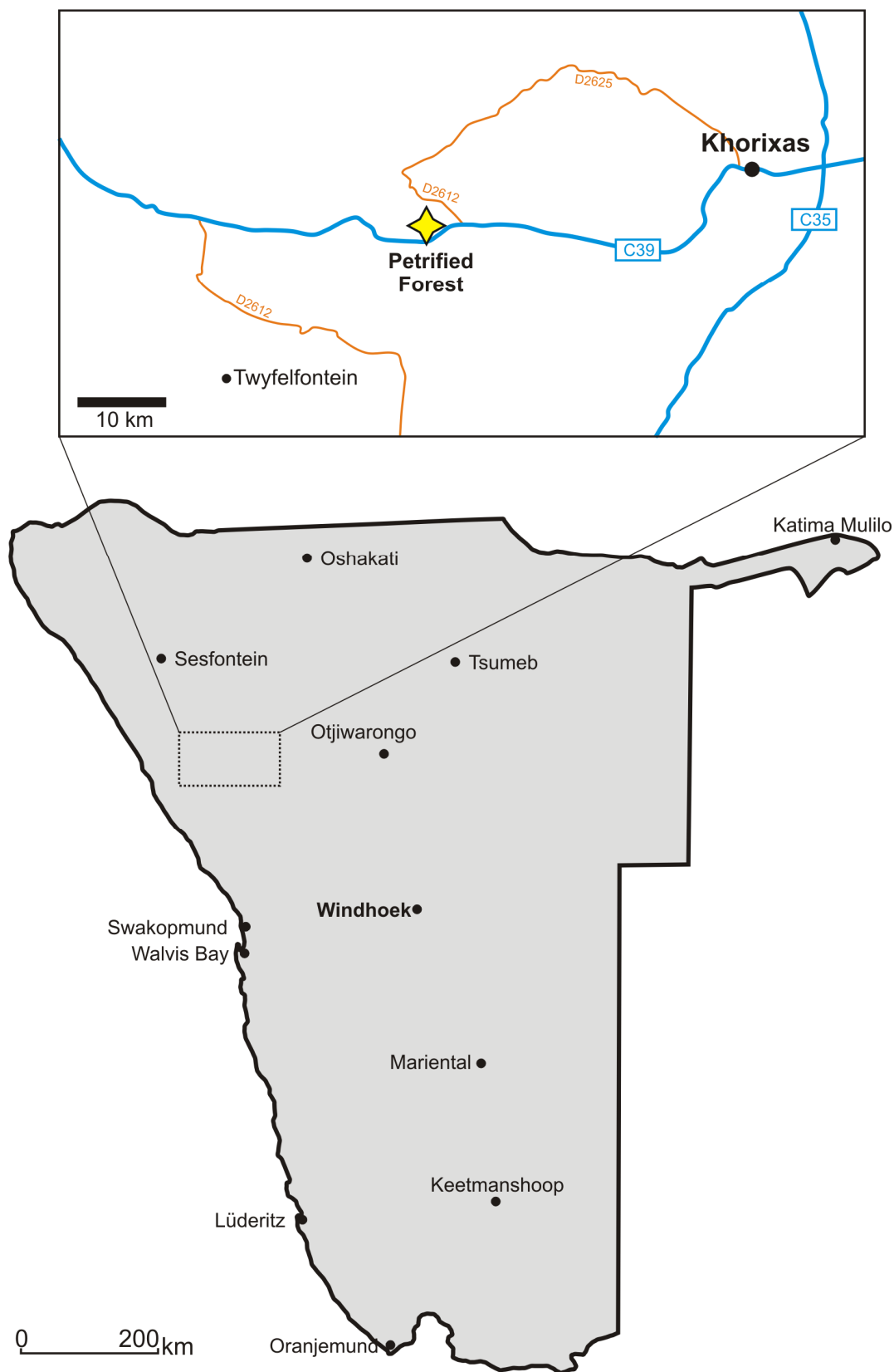


Fig. 1: Location of the Petrified Forest National Monument in Namibia.

## Geographical and geological setting

The site is located in the Aba-Huab River valley. The region receives almost no precipitation, the vast absence of vegetation allows a comprehensive overview of the geological conditions. Tipped and folded schists of the Neoproterozoic Damara Sequence make up the basement; they were once part of a fold mountain belt that, in the further course of the Neoproterozoic and Early Paleozoic, eroded down to a peneplain. During the Carboniferous, southern Africa was located near the South Pole and thus was completely covered by glaciers (Dwyka ice age). The gradual northward drifting of Gondwana since the Upper Carboniferous led to warmer climate conditions, accompanied by first limnic, then terrestrial sedimentation in what is today southern Africa, that lasted until the Cretaceous. In the Kunene region, this sedimentary sequence, stratigraphically known as Karoo Sequence, begins with moraines and tillites of the Dwyka ice age, followed by limnic and fluvial Lower Permian sediments (basal Eccca Group). The cool temperate climate with seasonal rainfalls did not only allow for plants to grow, but also shaped a landscape of lakes and rivers in the valleys that were left behind by the Dwyka ice age.

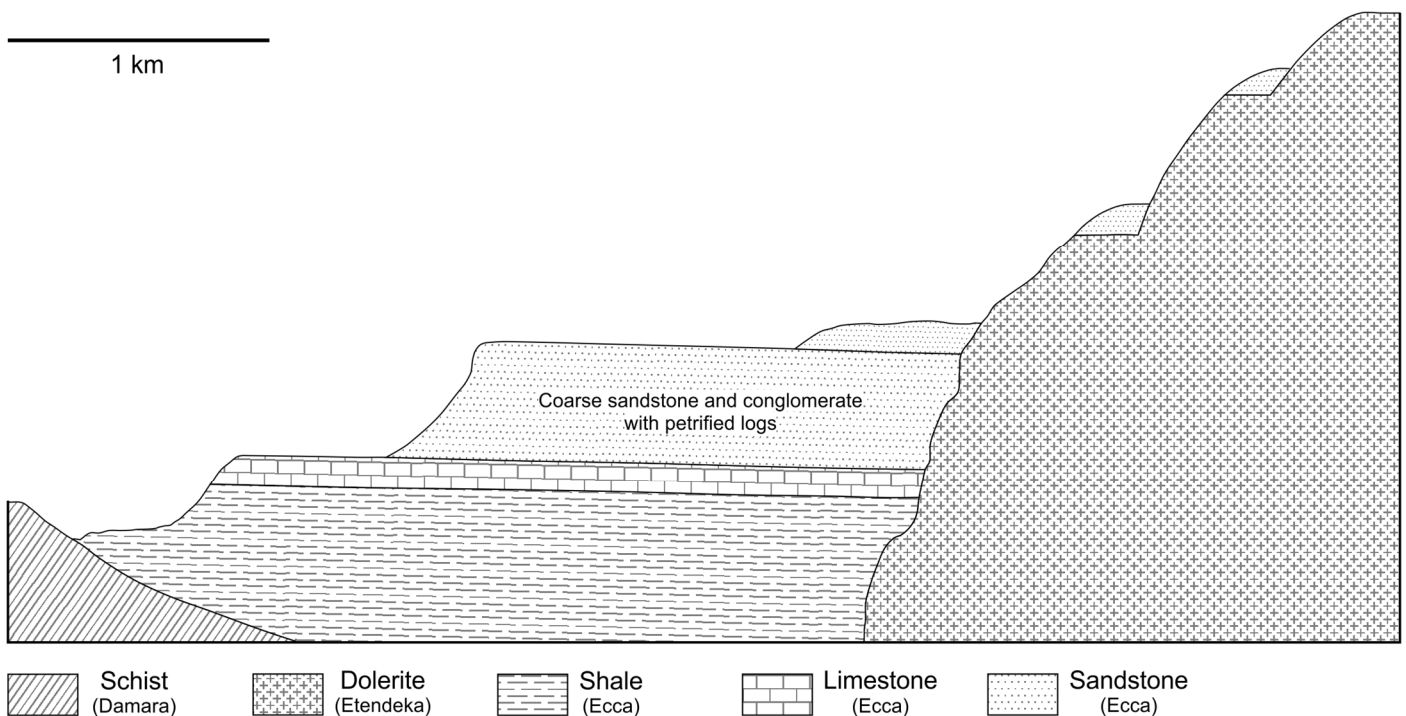


Fig. 2: Schematic geological cross section (north-south) of the Petrified Forest site, with horizontal scale (after KRÄUSEL, 1956).

The logs of the Petrified Forest were deposited some 280 Ma ago in such a river valley that followed a westward direction. The coarse sandstone, interbedded with layers of fine and medium grained gravel, bears witness to the high energy of the current that transported the material. It quickly covered the logs with sediment, also supporting the logs' quick and extensive silification. Remarkably, none of the logs has branches or roots attached – an evidence against burial at or near the original place of growth, instead the trunks were accumulated at this location by a sheet flood (SCHNEIDER, 2008). During the Lower Cretaceous, a phase of high tectonic activity, dolerite dykes intruded the region's sedimentary rocks.

The petrified wood deposit was discovered in the course of the Kaokoveld's seizure by white settlers after 1945 by the brothers A. J. und J. H. Oberholzer. It belonged to farm Rooiberg 517 until it was declared a National Monument by the South African administration on March 1<sup>st</sup>, 1950. First scientific studies were carried out by R. RODIN in 1951 (KRÄUSEL, 1956).





Fig. 3: A view to the north overlooking the fossil bearing sandstones. The mountain in the background is a dolerite intrusion.

All logs belong to the collective type *Dadoxylon arberi*, a representative of the conifer-like cordaitales. Histological examinations of the heartwood revealed seven different plant species: *Solenoxylon wissi*, *S. kurzi*, *S. oberholzeri*, *Lobatoxylon kaokense*, *Megaporoxylon kaokense*, *Kaokoxydon reuningi* and *K. durum* (KRÄUSEL, 1956). Distinct growth rings of variable width suggest a seasonal climate with pronounced rainfall fluctuations (SCHNEIDER, 2008).

Most remarkable are two especially large logs of up to 45 m in length and 1.2 m in diameter. Numerous smaller ones can also be seen. All logs are broken into segments with a maximum length of 2 m due to tectonic causes. Ongoing weathering breaks them apart into smaller and smaller pieces that here and there scatter the ground in abundance.





Fig. 4: Guide next to one of the largest logs.



Fig. 5: Log with an exposed length of 45 m.





Fig. 6: Conglomeratic sediment with quartz components.



Fig. 7: Fragment of petrified wood with distinct growth rings.



Fig. 8: Piece of a silicified trunk with large calcite crystals.





Fig. 9: Trunk cross section (scale: 6 cm).



Fig. 10: Logs *in situ*.





Fig. 11: Fragments of decayed logs covering the ground.

### Seeing the wood for the trees...

Several “petrified forests” on private farmland are located along C39 east and west of the Petrified Forest National Monument. They are signposted and can also be visited with guided tours. Number, size and preservation of the logs vary, but are an informative supplement.



Fig. 12: Sign pointing to another "petrified forest" on a nearby farm.



Fig. 13: Log with an exposed length of approximately 5 m on private farmland.

### Hints for visitors

The entrance fee is 80 N-\$ per person (March 2013). The guided tour takes approximately one hour.



Best visiting time is early morning due to high daytime temperature. Sun protection and water is recommended in the exposed area. Visitors with interest in botany will find several specimens of *Welwitschia mirabilis*, a species endemic to the Namib desert.

## Literature

KRÄUSEL, R. (1956): Der „Versteinerte Wald“ im Kaokoveld, Südwest-Afrika. – Senck. leth., **37**: 411-453, Frankfurt am Main.

SCHNEIDER, G. (2008): The Roadside Geology of Namibia. – Sammlung Geologischer Führer, **97**, 294 p., 112 fig., 1 tab., Stuttgart (Borntraeger).



### **Fossil collectors beware!**

*The general export ban for fossils from Namibia should absolutely be observed. A collecting and export permit must be requested from the Ministry of Mines & Energy in Windhoek.*