The Ø 1270 x 950 km Permian Triassic Impact Crater → Supplement 1 to the geophysical evidence (Part 6b)

Please also read : **Part 1** to **Part 6** of my PT-Impact Hypothesis - more infos at : www.permiantriassic.de (or : www.permiantriassic.at)

by Harry K. Hahn / Germany - **30.12.2022** - **Note** : This document is not allowed for commercial use

Abstract :

This is a supplement document to my Summary of geophysical evidence for the Ø 1270x950 km Permian Triassic (PT)-Impact Crater (→ see **Part 6b** of my hypothesis)

The purpose of this document is to point-out the main geo-physical features visible on our planet Earth, that were directly caused by the Permian Triassic Impact Event. With these new images I want to support my hypothesis and provide a strong case for further scientific research regarding the discovered Ø 1270x950 km PT–Crater. (page2-6)

Further I want to inform the interested reader about two other possible impact-structures on Earth, which I believe are a result of the global PT-Impact Event too.

The first structure seems to be a "smaller twin" of the PT-Impact Crater. It is the **Tarim Basin in North-West China.** The Kunlun Mountains around it indicate an age of 250 Ma !

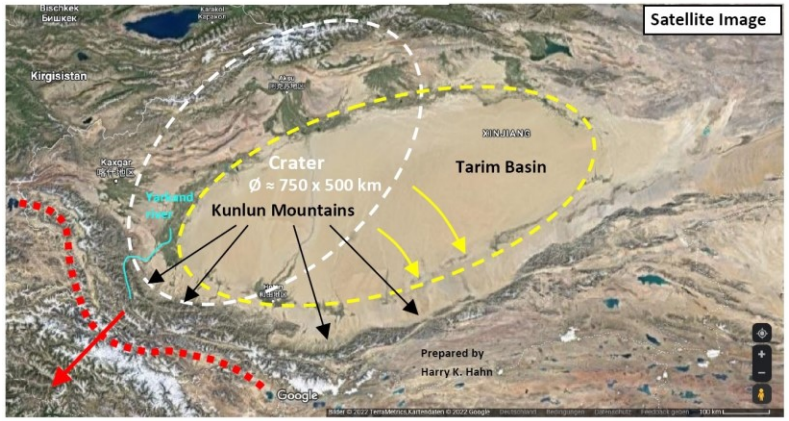
The Tarim Basin has an approximate elliptical shape with the dimensions of ≈ 900 x 400 km (see page 7 & 8). This basin probably was formed by a second impactor that impacted in-line with the main-impactor which has caused the PT-Impact crater. Or in other words, the impactor which has caused the Tarim Basin in all probability was on the same orbit (trajectory) as the PT-Impactor, during the PT-Impact Event, either a bit ahead or behind of the main-impactor.
The 900 x 400 km elliptical Tarim Basin probably had a shorter elliptical outline of around 750 x 500 km shortly after the PT-Impact, but was then deformed (squeezed) later.

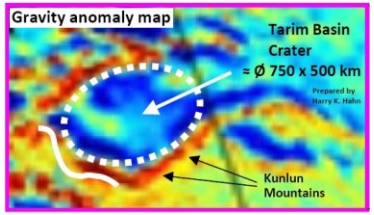
If we use the double-oblique elliptical impact crater-twin on Mars as a reference (see explanation in this study), then the Tarim-Basin Impact was caused by a similar effect as the smaller oblique impact crater of the Mars-Impact, which is located in-line with the bigger oblique impact crater but a bit uprange (ahead) of the main impact crater.
In the NASA-study about this double-oblique impact on Mars, as reason for this double-impact, the probable collapse (break-up into pieces) of the impactor shortly before the impact was mentioned. This collapse (break-up into two pieces) of the impactor just before the impact in all probability was caused by atmospheric effects (e.g. by the atmospheric impact-shock-wave which hit the impactor, and atmospheric drag etc.). Initial cracks inside the impactor probably already occurred when the impactor reached the "Roche-limit" of Mars (the point where gravitational forces start to rip the impactor apart). In the case of the PT-impactor the situation probably was very similar !

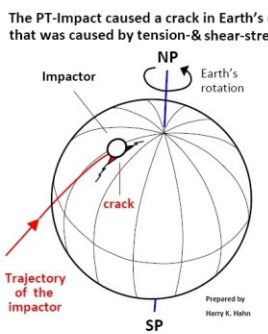
The other possible impact-structure which I want to describe is **the 41 x 32 km elliptical shaped F'derik Zouerate district Iron-ore mine in Mauretania** (NW-Africa). see page 9
It is located in a dark colored area which contains Fe-rich minerals. This iron-rich area has an outline which can be fit precisely into an ellipse ! That's why I believe that this iron-rich area is the result of a secondary- or tertiary-impact in the PT-Ejecta Ray R1, which was caused by the PT-Impact Event and which runs along the NW-coast of Africa.

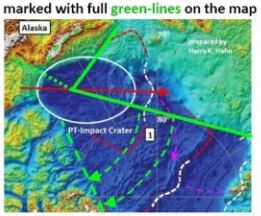
All parts of my PT-Impact Hypothesis + images of Rock Samples & Sample Sites are available on my website : www.permiantriassic.de (or : www.permiantriassic.at)

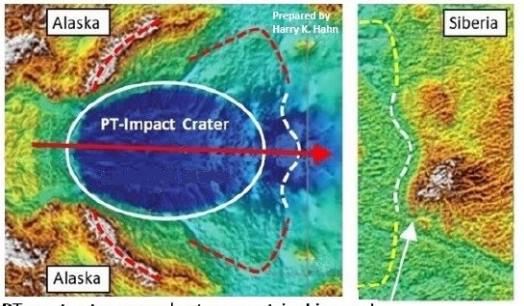
The Tarim Basin and the Kunlun Mountains in NW-China seem to represent an impact crater similar to the PT-Crater !



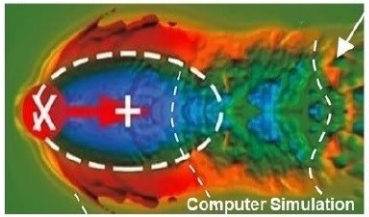








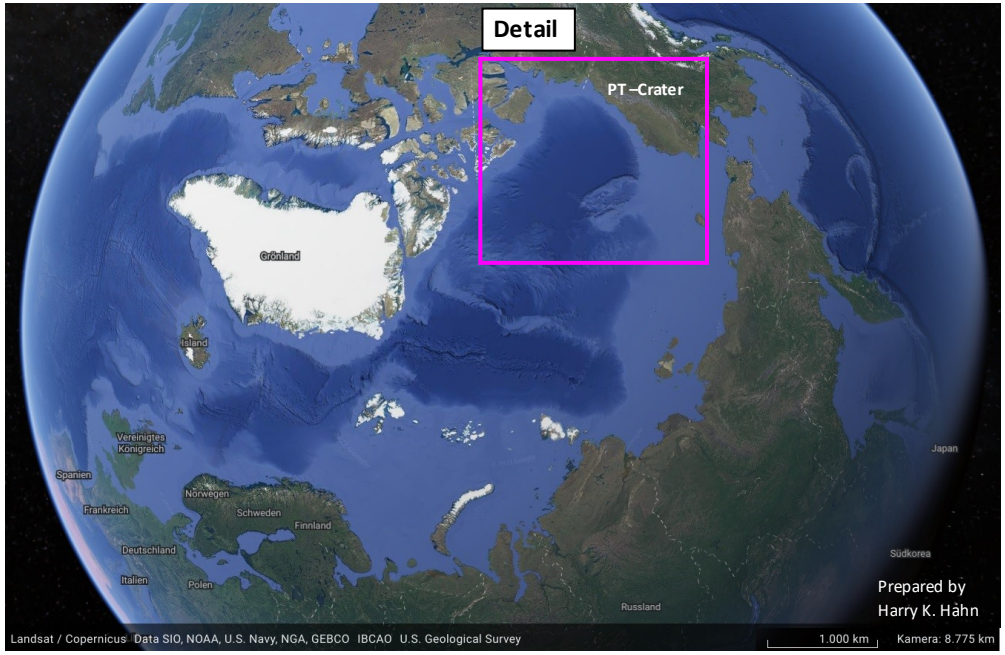
PT- crater topography (symmetrical image)

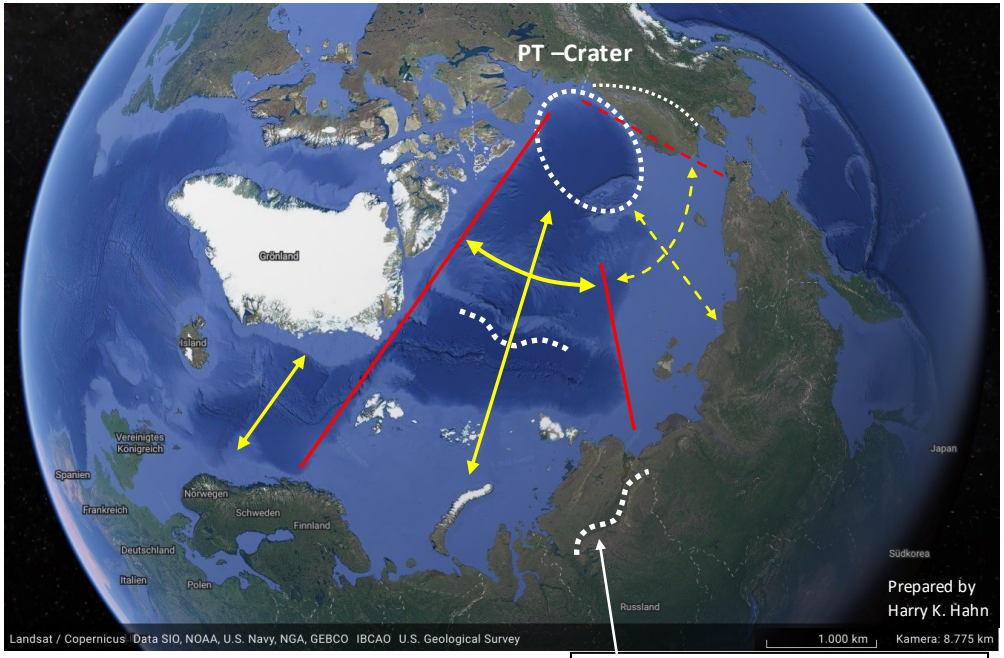


Note similarity of bow-shaped structure !

→ structure was caused by the motion of the impactor along the surface

Global view of the PT – Impact Crater area : → important topographic features & trendlines are marked on the images



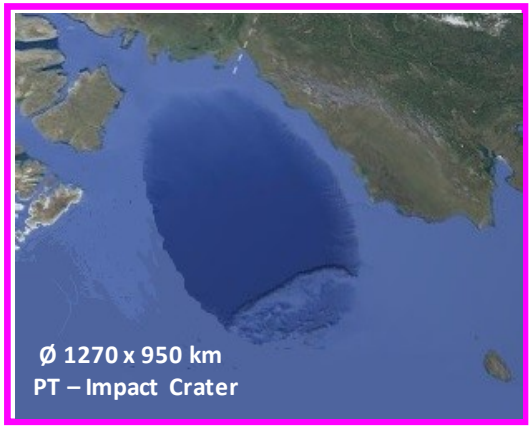


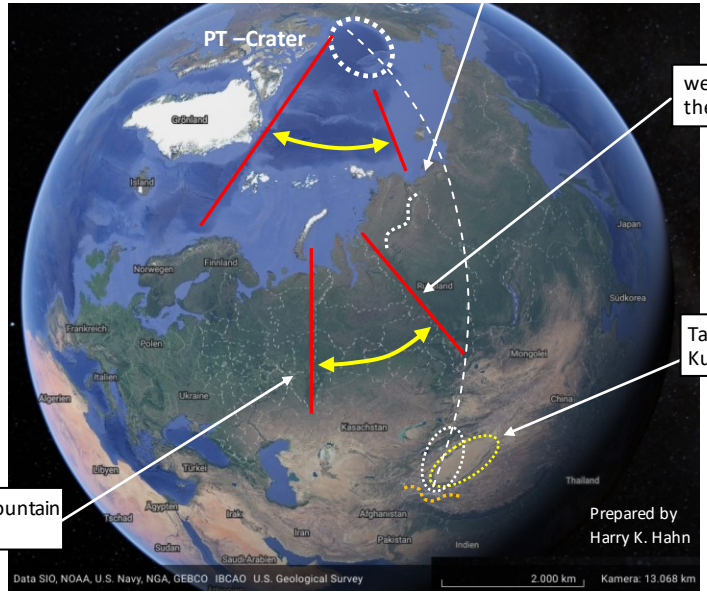
Front-End of the PT-Crater
(→ northern edge of the Siberian Traps)

Crater area shown without the angle sector of Earth's crust that openend-up caused by a Crack & Expansion Tectonics

Detail :

Manipulated Topographic map





western Edge of the Angara Craton

Tarim Basin & Kulun Mountains

Ural Mountain Range

Note the strong similarity of the structures visible on a topographic map of the PT-crater-area, to structures calculated by a computer simulation of a big oblique impact :

The Ø 1270 x 950 km Permian-Triassic Crater

The real PT-Crater topography →

The "Brooks Range" was caused by the PT-Impact

The reason why the elliptical crater-rim on the right-side of the crater is missing, was a crack in Earth's crust that opened up and expanded after the impact event !

A bow-shaped feature similar to the "Brooks Range" also existed on the right-side of the PTI-Crater. But because of the mentioned crack and because of expansion tectonics this bow-shaped feature broke-apart into fragments. These fragments in all probability are the following canadian islands today : **Ellesmere Isand, Axel Heiberg Island** and **Devon Island** in North-Canada

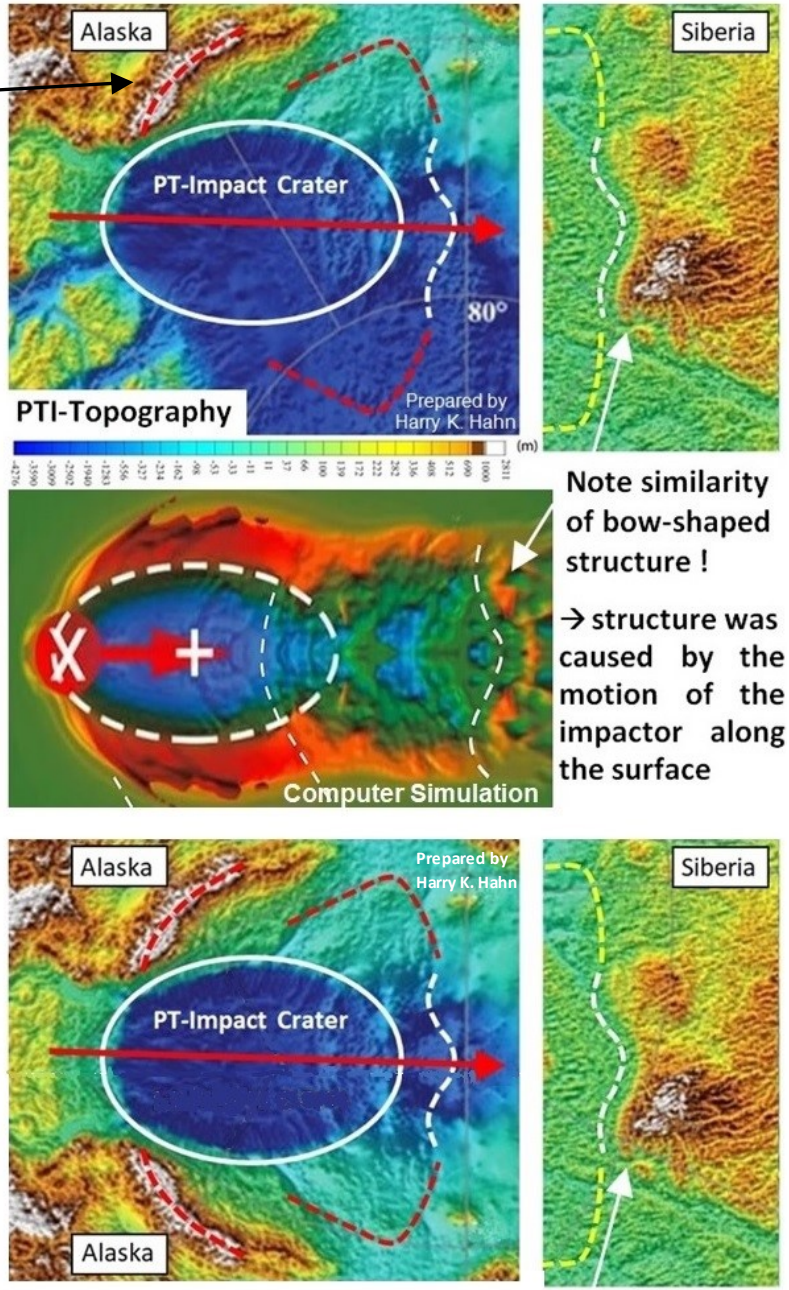
Computer Simulation of a 5° to 7° (degree) oblique impact →

Manipulated PTI - topographic map →

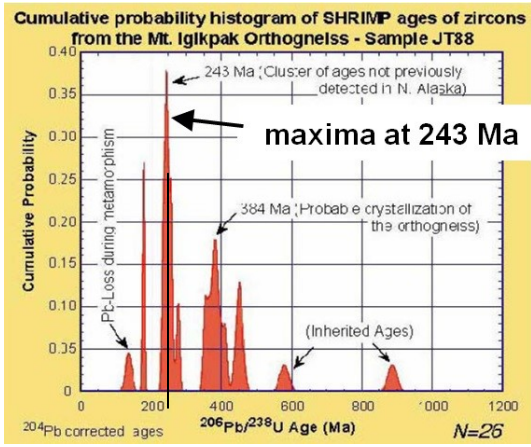
This map illustrates the strong similarity of the real PT-topography to the structure calculated by the computer simulation !

In this image I have mirrored the left-side of the real PT-topography to the right-side of the crater to create a symmetrical image

➔ **Weblink to the topographic map**



An age-analysis of the "Brooks Range" indicates a formation-age of ≈ 250 Ma



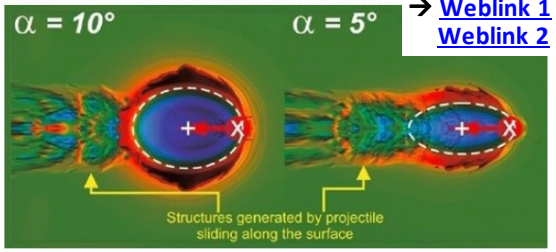
➔ **Weblink to this analysis**

The transition from circular to elliptical impact craters

Dirk Elbeshausen,[1] Kai Wünnemann,[1] and Gareth S. Collins[2]

[5] To investigate crater formation for shallow-angle impacts, we have carried out a series of 3-D simulations with the hydrocode iSALE-3D [*Elbeshausen and Wünnemann*, 2011; *Elbeshausen et al.*, 2009]. This code uses finite difference and finite volume techniques on a Cartesian staggered mesh. It follows an Implicit Continuous-fluid Eulerian and Arbitrary Lagrangian-Eulerian (ICE'd ALE) approach, as described in *Harlow and Amsden* [1971] and *Hirt et al.* [1974],

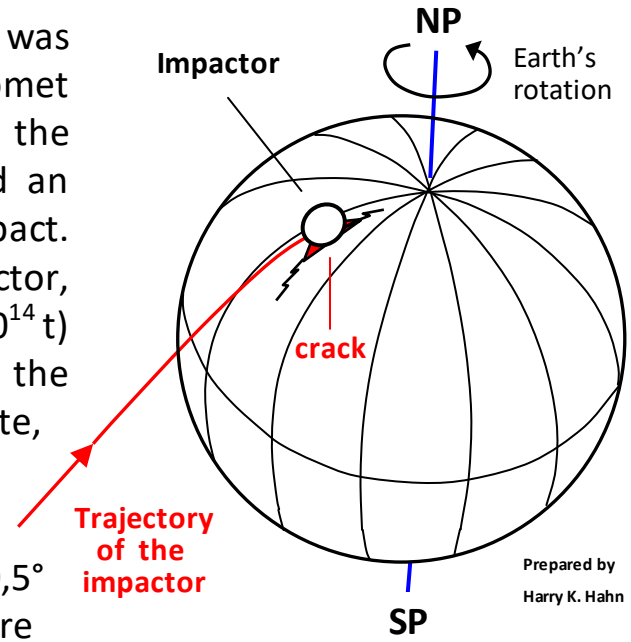
Figure 2. Influence of the impact angle on crater shape. Impact of a 5 km sized projectile at 8 km/s and low impact angles α (friction coefficient f=0.3; no cohesion). The dashed white line marks the inner boundary of the crater cavity just before the onset of crater modification (measured at the preimpact surface). The cross (X) indicates the contact point of the projectile with the target, the "+" marks the geometric center of the crater. The secondary structures close to the left crater rim are the result of the projectile motion along the target surface (friction) and indicate a very oblique impact angle. The color contours denote the elevation where green represents the initial level of the target, blue represents topography below, and red above the target level.



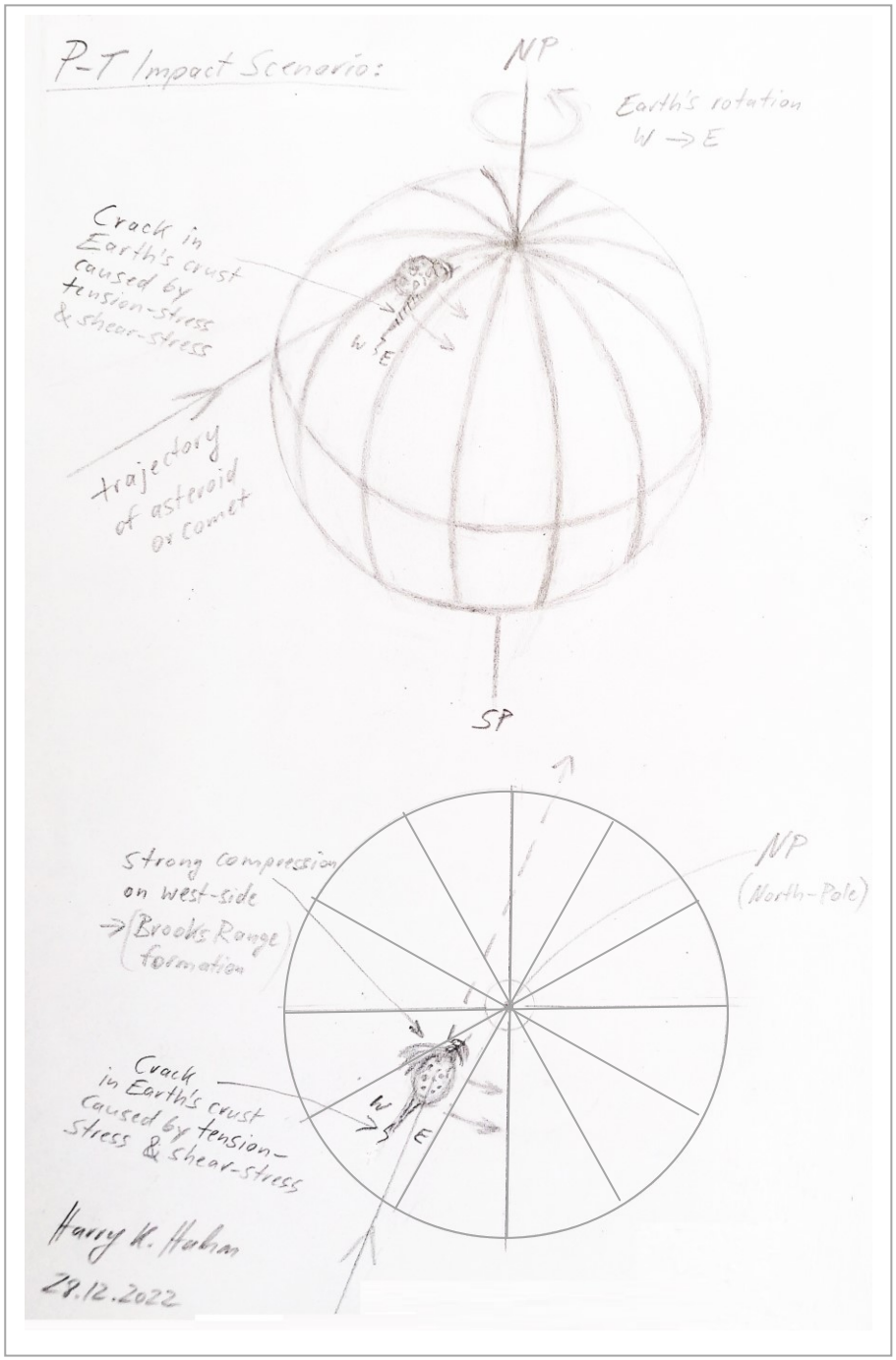
→ Weblink 1
Weblink 2

The PT-Impact caused a crack in Earth's crust , that was caused by tension- & shear-stress

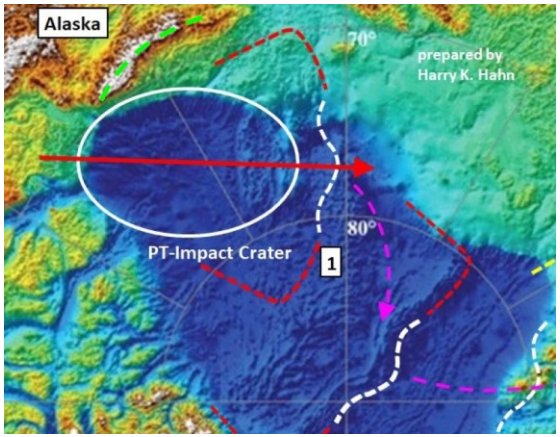
Because the **PT-Impact Crater** was caused by a large asteroid or comet in the **Ø 50 – 200 km** range the inertia of the impactor played an important role during the impact. The immense mass of the impactor, probably ≥ 500 trillon tons ($5x10^{14}$ t) deccelarated Earth's crust on the left side (west) of the impact site, during the crater formation which took around 120 sec.



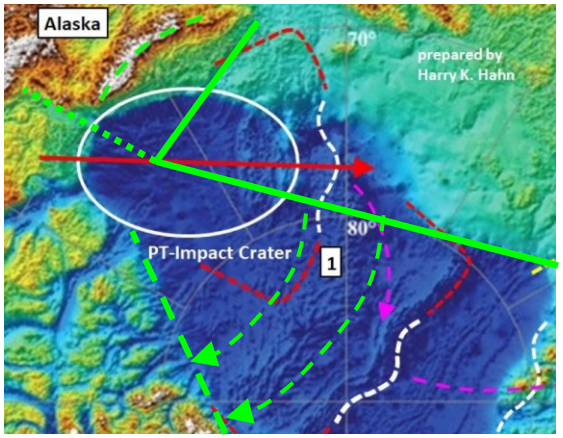
Because Earth rotated around 0,5° during the crater formation there was tension- & shear-stress building-up on the right side (east) of the impact site. This has lead to a large initial crack in Earth's crust in particular on the right side of the impact crater. This crack in Earth's crust quickly opened-up during the later Expansion Tectonics process. The formation of the crack(s) was supported by very strong ejecta rays



PT-Crater topography



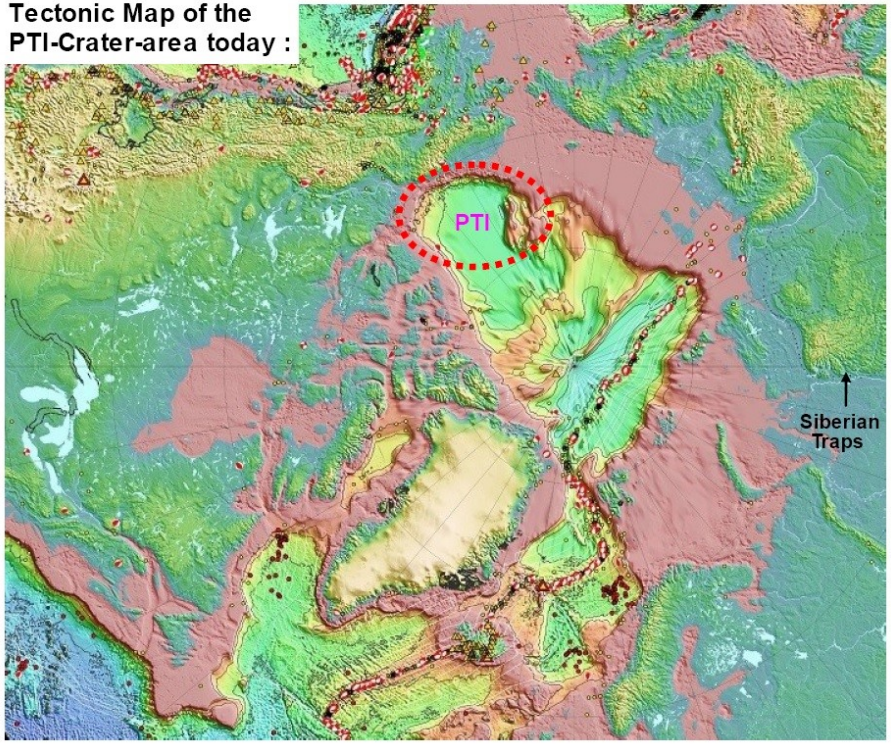
The initial cracks in Earth's crust are marked with full green-lines on the map



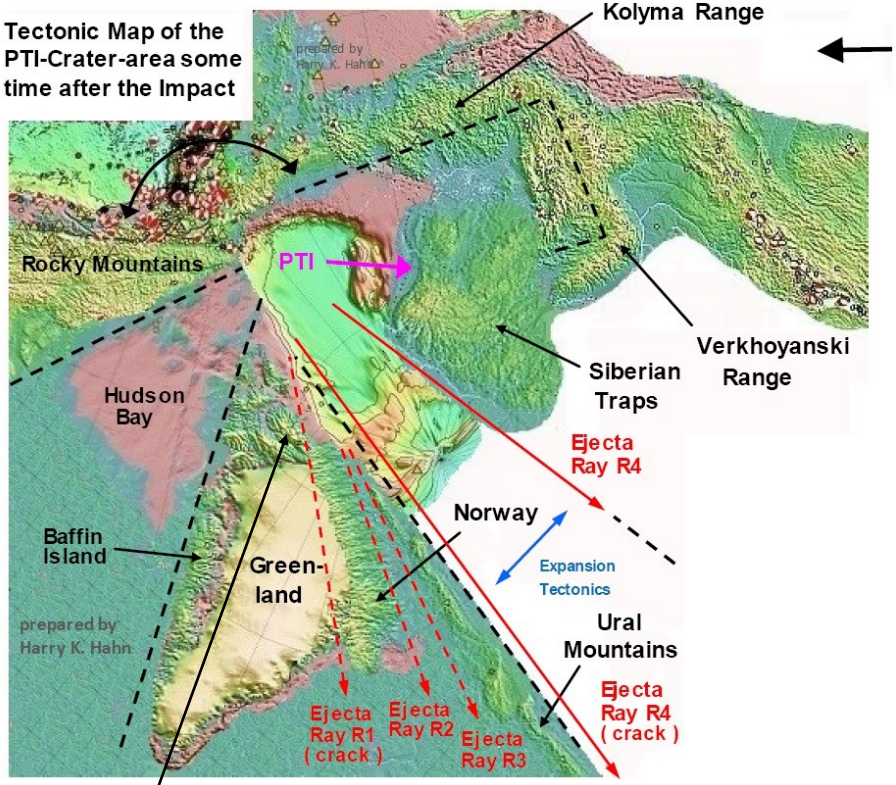
A re-constructed Tectonic Map of the Ø 1270 x 950 km Permian-Triassic Crater-area a certain time after the Impact Event

I have re-arranged some key-areas of the Tectonic- (Topographic-) Map of the PTI-Crater-area to provide a clearer picture of the deformations which the PT-Impact caused on Earth's crust. This will make it a bit easier for Tectono-physicists (Geo-physicists) to confirm the existence of the PT-Crater and the Expansion Tectonics process that obviously was triggered by this Impact Event !

Tectonic Map of the PTI-Crater-area today :



Tectonic Map of the PTI-Crater-area some time after the Impact



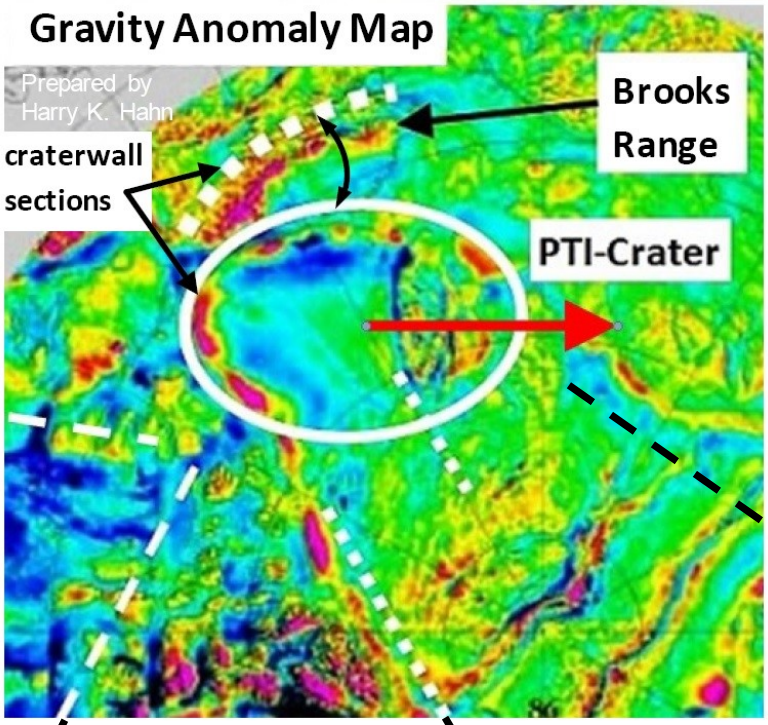
The manipulated tectonic-(topographic-) map on the left shows the PT-Impact area as it probably looked a certain time after the Impact The Hudson Bay (CA) and the Kolyma Range in Siberia were caused by ejecta-lobes of the PTI, which show the same ejecta triangle structure as an impact on planet Pluto and as two other secondary impacts caused by the PTI (see below)

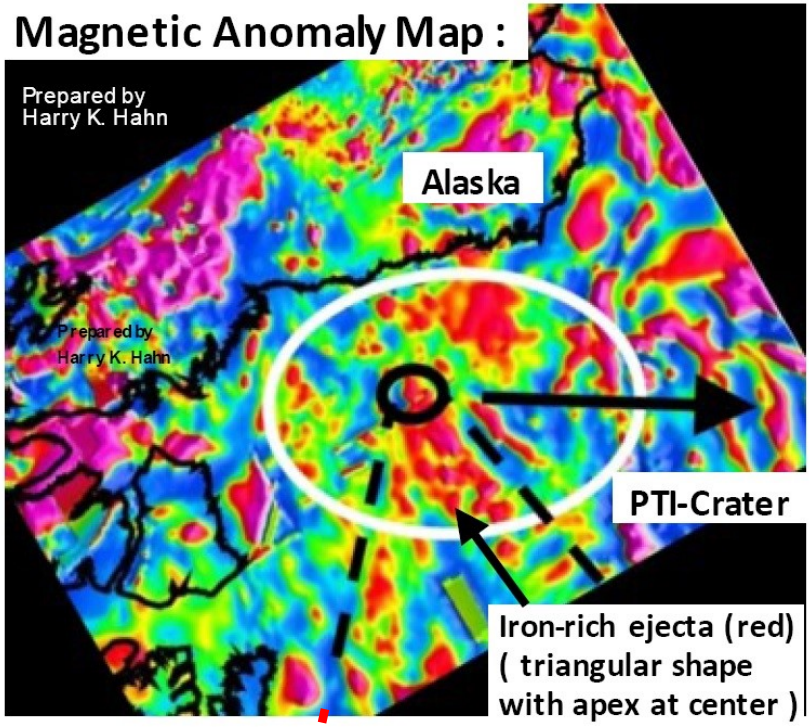
Ellesmere Isand, Axel Heiberg Island and **Devon Island** in North-Canada

→ These islands in all probability represent fragments of a „bow-shaped" feature similar to the „Brooks-Range" that existed on the right-side of the PT-Crater directly after the impact event.

The reason why the elliptical crater-rim on the right-side of the crater is missing, was a crack in Earth's crust that opened up and expanded after the impact event ! (see map above)

The gravity anomaly map & magnetic anomaly map provide clear indication for the PT-Crater





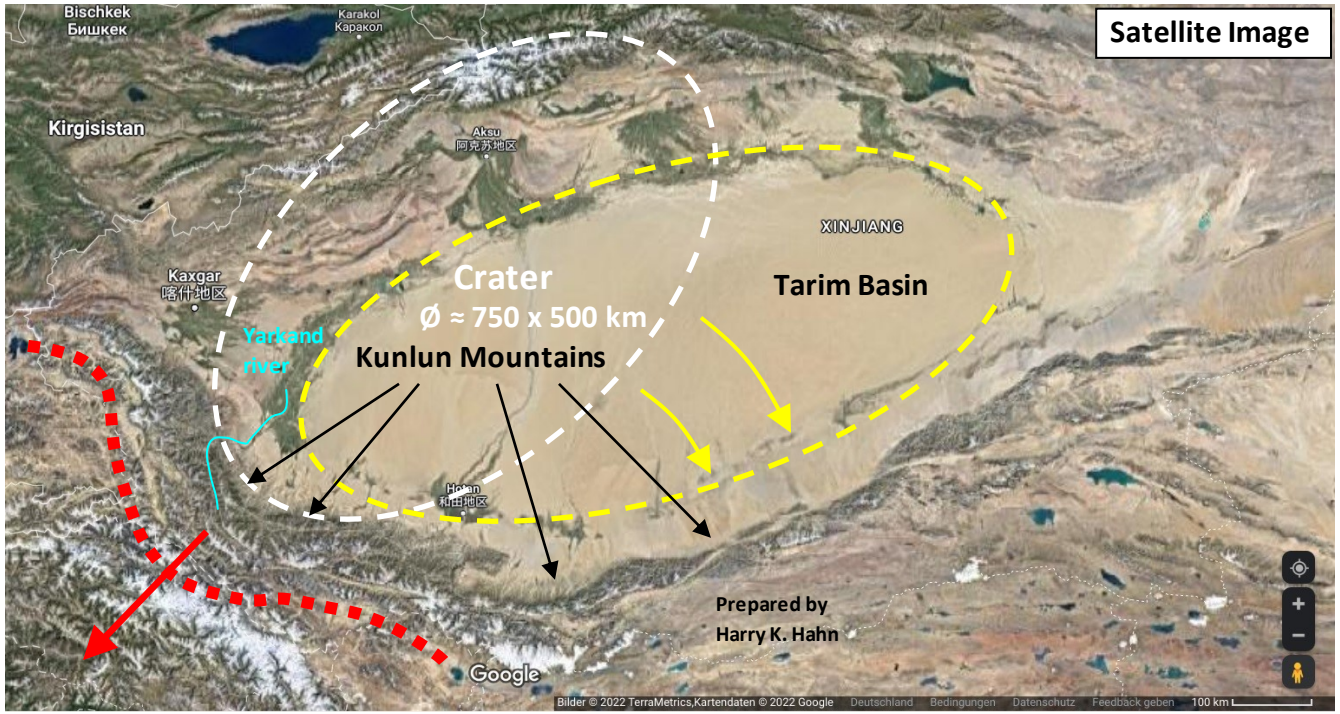
→ Weblink 1
Weblink 2

→ Weblink 3

angle sector of Earth's crust that openend-up because of a Crack & Expansion Tectonics (→ probably caused by a strong ejecta ray + Earth's rotation)

large amounts of iron-rich ejecta probably supported the formation of a crack in Earth's crust on the right-side of the PT-Impact Crater

The Tarim Basin and the Kunlun Mountains in NW-China seem to represent an impact crater similar to the PT-Crater !



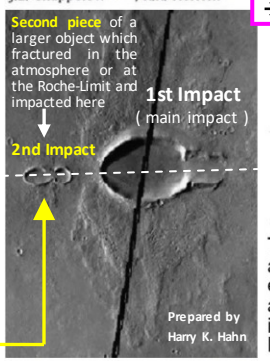
The bow-shaped **Kunlun mountain-range** on the west-side of the **Tarim Basin** in northwest China has the same "bow-wave shape" as the northern edge of the Siberian Plateau (Siberian Traps). The Britannica Encyclopaedia shows that the folded structures and the granitic rocks of the **Kunlun Mountains** date to about **250 million years** ago ! Therefore I assume that this bow-shaped range and the Tarim Basin were formed by the same global P/T-Impact Event !

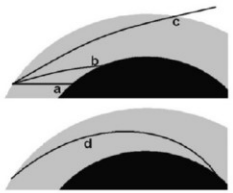
Like the elliptical impact on Mars, the **Tarim Basin** may represent a **second impact** that impacted **in-line with the PTI**.

On the origin of a double, oblique impact on Mars

J.E. Chappelow [a,b,*], R.R. Herrick [b]

→ : Weblink1, Weblink2



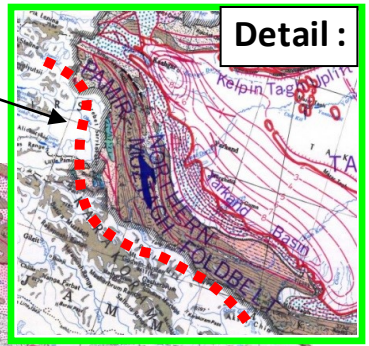


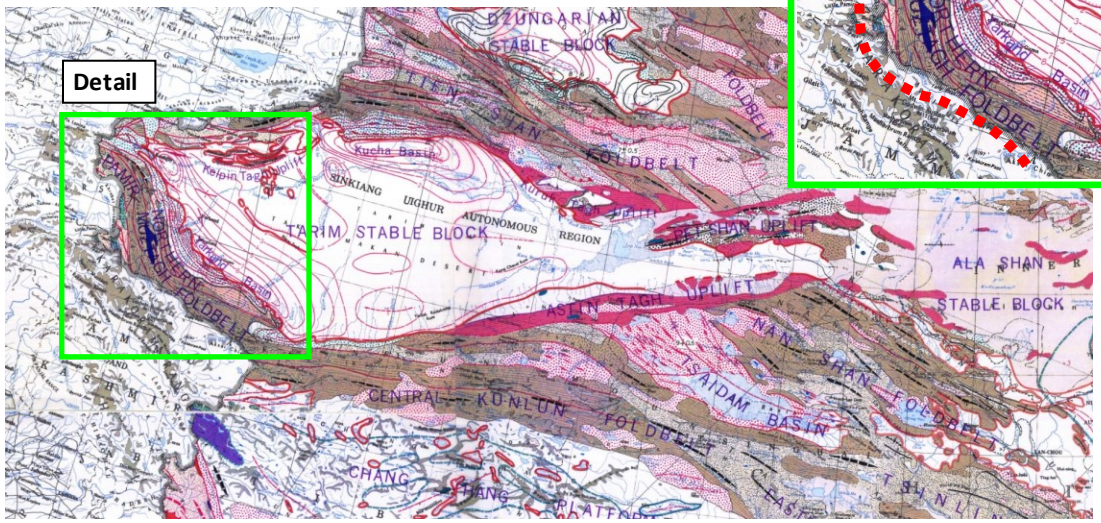
The trajectory (**d**) of the asteroid that caused the elliptical impact on Mars and the trajectory of the impactor that caused the PT-Impact were similar !

Fig. 1. A large (7.5 × 10.0 km) elliptical crater with a smaller elliptical crater (2.0 × 3.0 km) lying 12.5 km directly uprange (to the left). 'Butterfly'-pattern ejecta occur around both craters. (Mosaic of THEMIS daytime IR images.) North is up.

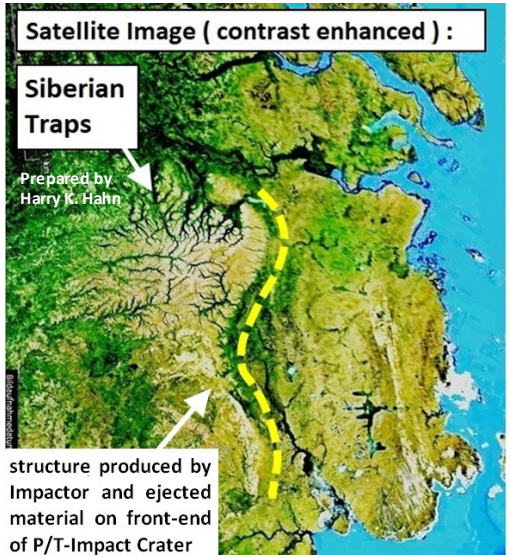
Fig. 2. Atmospheric flight trajectories for asteroids (top) and a moonlet (bottom) in the martian atmosphere, as discussed in the text. Both are radially exaggerated.

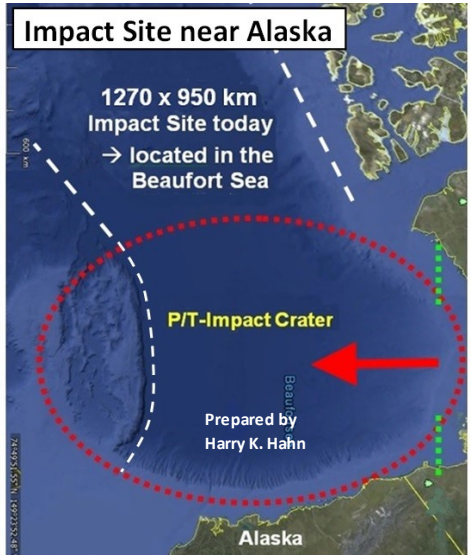
The bow-shaped "Northern Pamir Muztagh Foldbelt" may represent the front-end of another oblique PT-Crater





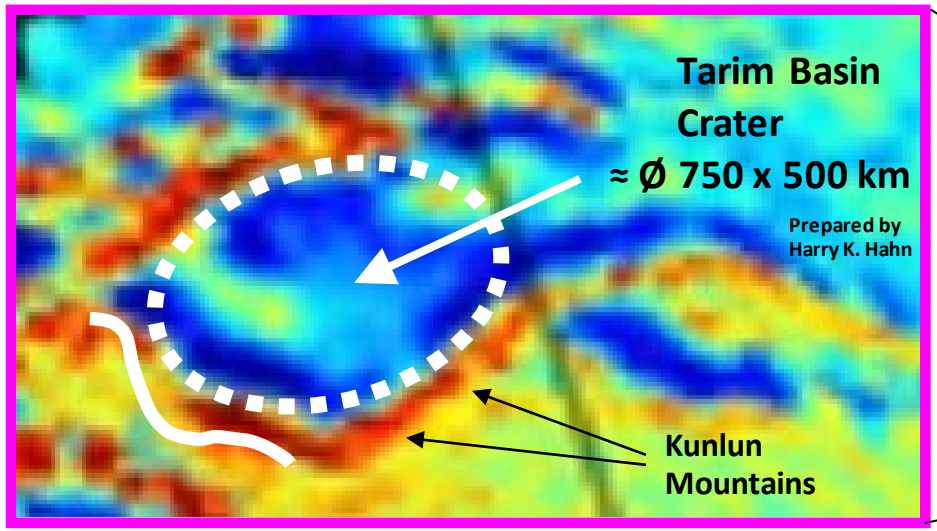
For comparison : front-end of the PT-Impact Crater



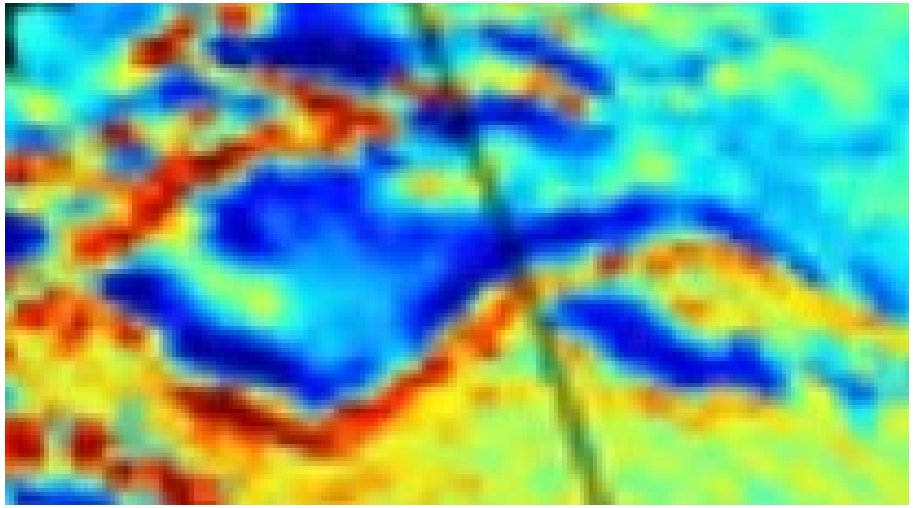


The gravity anomaly map of the Tarim Basin shows a strong negative anomaly (blue)

This indicates that the Tarim Basin and the surrounding Kulun-Mountains (positive anomaly) were caused during the global Permian Triassic Impact Event (see explanation on previous page)

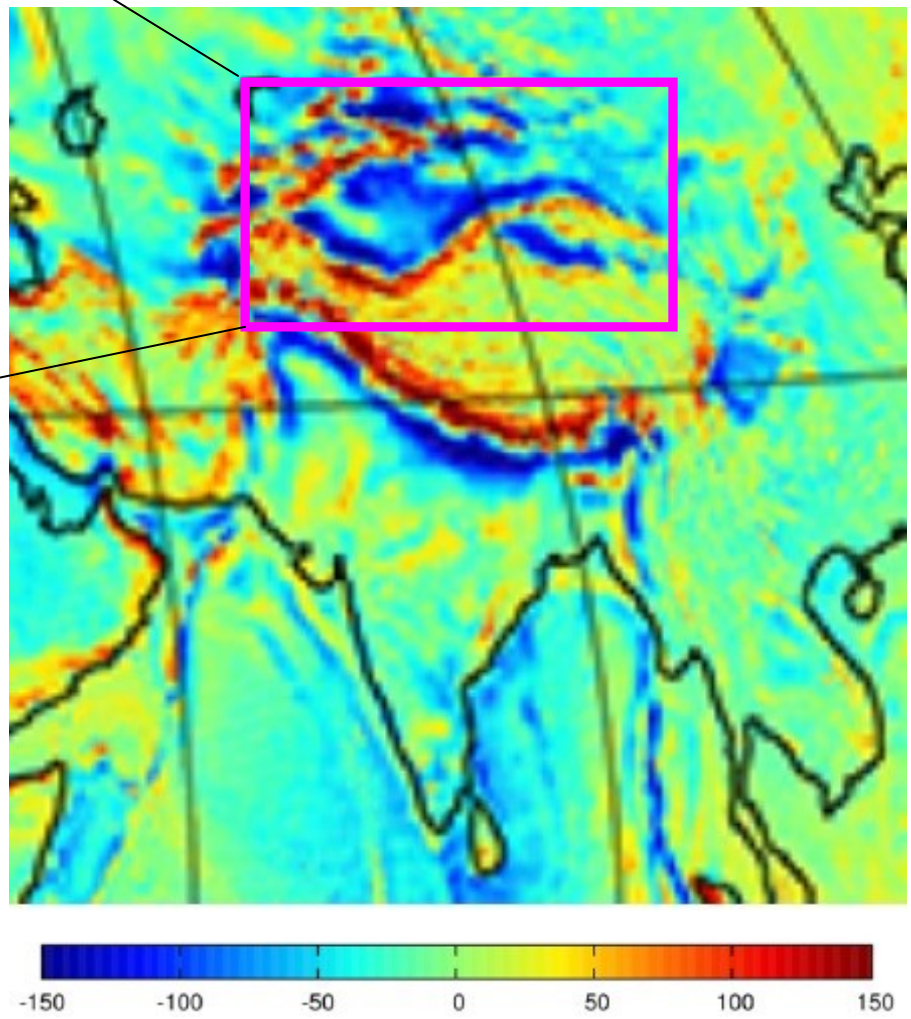


Gravity anomaly map of the Tarim Basin



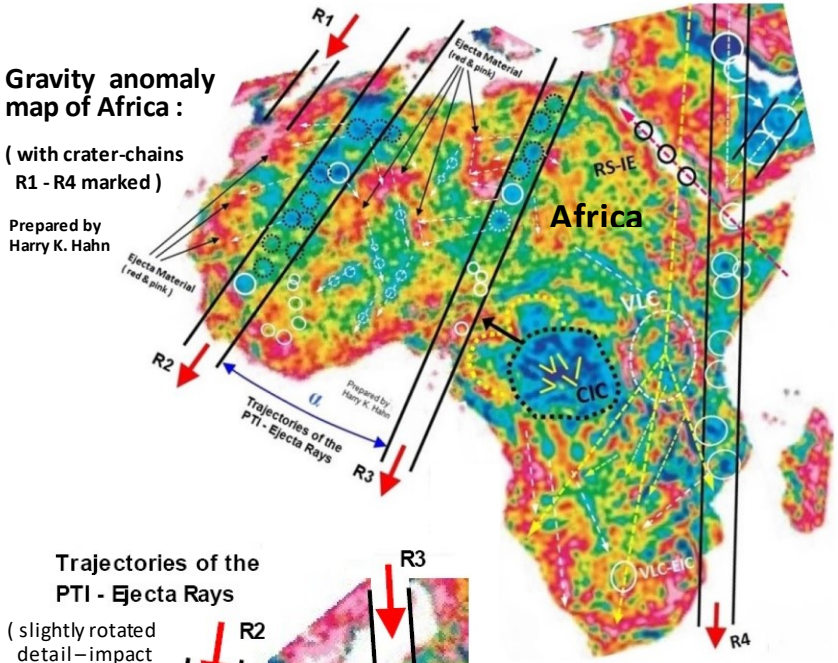
Gravity anomaly map of the India-Himalaya region

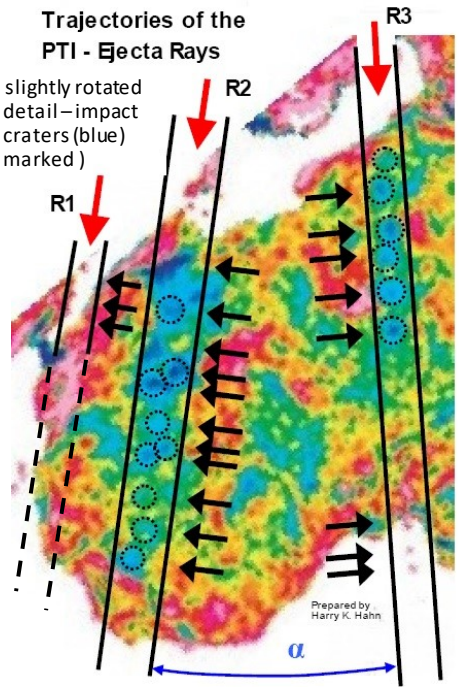
See weblink : Weblink 1, Weblink 2



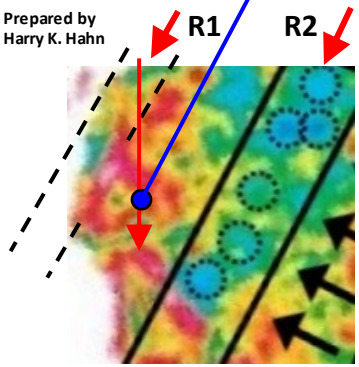
The F'derik Zouerate iron-ore mine in Mauretania may have been caused by iron-rich ejecta from Secondary-Craters within the R1-Ejecta Ray of the Permian Triassic (PT) Impact Event

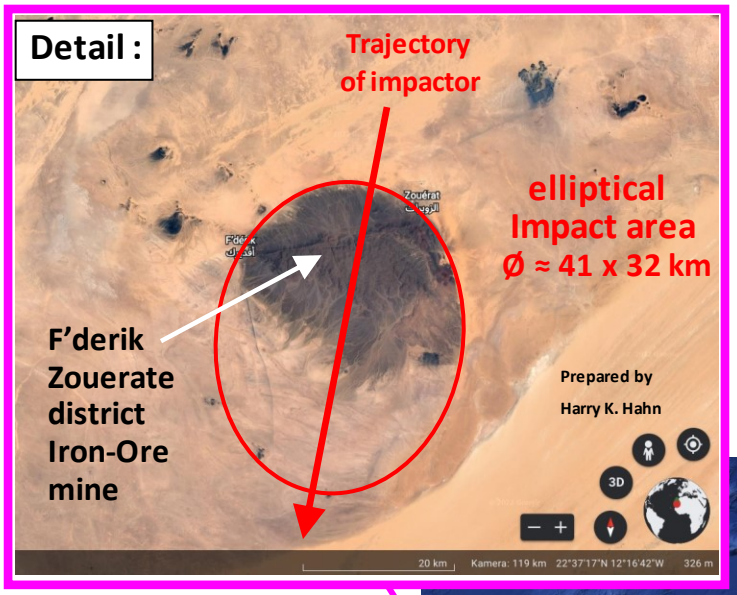
There are four (secondary) impact crater chains **R1 to R4** visible on the gravity anomaly map of Africa, which probably were caused by ejecta from the PT-Impact. The ejecta rays which caused R1 to R4 originate in the center of the PTI-Crater ! The **F'derik Zouerate iron-ore deposits** probably were caused by **R1** ! (see also **Part 2** of my study)





The gravity anomaly map indicates that the **F'derik Zouerate iron-ore** (**mine**) was caused by ejecta (red) from craters within the **R1-Ejecta Ray** of the Permian Triassic (PT) Impact event



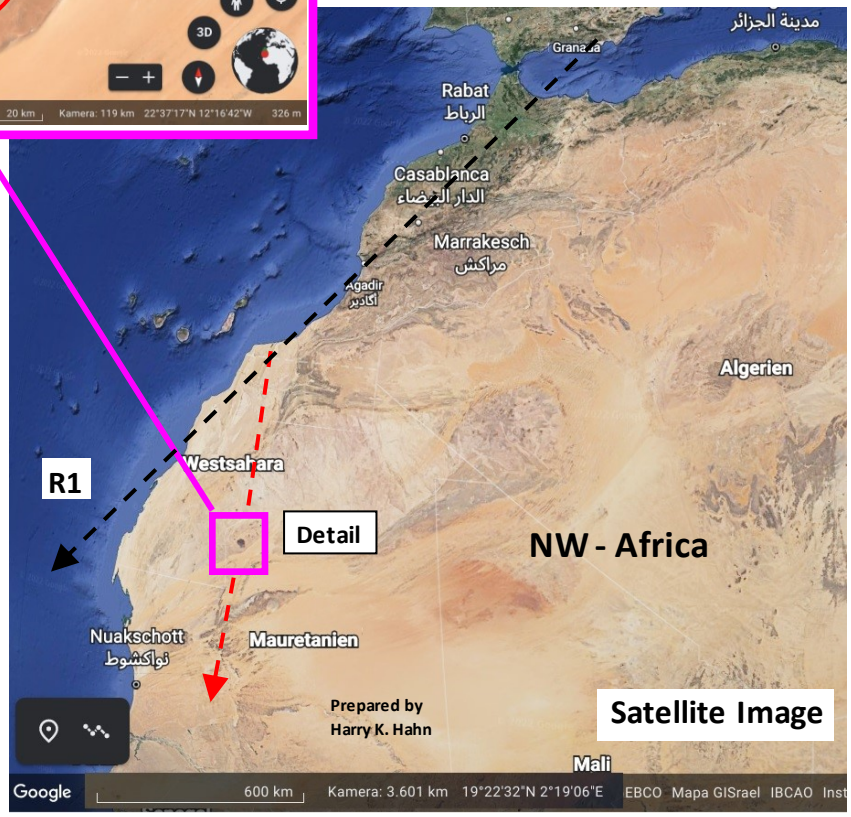


The high-grade iron-ore that was mined in the **F'derik Zouerate district iron-ore mine** in Mauretania since 1952 reached **60-65 wt% Fe** !

Today the magnetite iron-ore comes from Algoma-type banded iron formations (BIF). The main host is magnetite quarzite layers within Mesoarchean **granulite** facies

Granulite Facies are highly metamorphed rocks which were transformed under a pressure of around 1Gpa and temperatures of ≈ 700-900°C

The **F'derik Zouerate district iron-ore mine** in Mauretania is located in a dark colored area which contains Fe-rich minerals (high-grade iron-ore minerals). **This iron-rich area has an outline (shape) which can be fit precisely into an ellipse !** → see image on the left ! (even if the southern section isn't visible) Therefore I believe that the iron-rich area is the result of a secondary- or tertiary-impact caused by the PT-Impact Event. And the iron in the metamorphed rock was coming from iron-rich PTI-ejecta !



References :

Hypothesis about the Permian Triassic Impact Event (PTI) → weblinks to the Parts 1 to 6 of my hypothesis : → available on **vixra.org** and on **archive.org**

Weblinks to my studies on → vixra.org :	**Weblinks to my studies on → archive.org**
Part 1 : https://vixra.org/abs/2012.0210	Study-Part 1
Part 2 : https://vixra.org/abs/2101.0052	Study-Part 2
Part 3 : https://vixra.org/abs/2101.0096	Study-Part 3
Part 4 : https://vixra.org/abs/2101.0067	Study-Part 4
Part 5 : https://vixra.org/abs/2101.0127	Study-Part 5
Part 6 : https://vixra.org/abs/2104.0099	Study-Part 6
Part 6b : https://vixra.org/abs/2110.0042	Study-Part 6b

Studies which indicate a Permian Triassic Impact Event :

1. Kunio Kaiho, Y.Kajiwara, Yasunori Miura : End-Permian catastrophe by bolide impact: Evidence of a gigantic release of sulfur from the mantle September 2002, Tohoku University & Yamaguchi University, Japan
2. Jim Standard & C. Austen Angell **:** Raining lead around 250 mya : A smoking gun for an Australian impact origin of the Permian Extinction Department of Chemistry and Biochemistry, Arizona State University - A study which indicates a Permian-Triassic Impact Event in Australia :
3. C. Koeberl, F. Martinez-Ruiz : **Impact Markers in the Stratigraphic Record** 2003 ; Springer Verlag ; ISBN : 3-540-00630-3

Lecture about the Permian-Triassic Extinction Event : Permian-Triassic Mayhem: Earth's Largest Mass Extinction - YouTube

References to general studies about Impact Cratering :

1. Dirk Elbeshausen, Kai Wünnemann, Gareth S Collins : **The transition from circular to elliptical impact craters** → or alternative : weblink 2
2. Dirk Elbeshausen, Kai Wünnemann : **The Effect of Target Topography and Impact Angle on Crater Formation** -- Insight from 3D Numerical Modelling
3. Michael H. Poelchau : **The subsurface structure of oblique impact craters**
4. Dr. Ludovic Ferriere : Introduction : **Impact Metamorphism** → weblink : http://www.meteorimpactonearth.com/impactmeta.html
5. W.U. Reimold, R.L. Gibson : **Meteorite Impact** ; Council for Geoscience, Germany 2009, Springer Verlag
6. R.L. Gibson, W.U. Reimold : **Large Meteorite Impacts and Planetary Evolution IV** The Geological Society of America, Special Paper 465 Boulder Colorado 2010 ; ISBN: 978-0-8137-2465-2
7. C. Koeberl, F. Martinez-Ruiz : **Impact Markers in the Stratigraphic Record** 2003 ; Springer Verlag ; ISBN : 3-540-00630-3
8. R.W.K. Potter : **Numerical modelling of basin-scale impact crater formation** → http://www.lpi.usra.edu/lpi/potter/publications/RossThesis.pdf, **see also**: Orientale impact
9. **Crater Formation on the Moon** → Animations to explain the Crater Formation on the Moon