A new neolithic circular enclosure in Central Germany

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How it began: Neolithic expansion

- 5000 years B.C. there were significant changes in the colonization of central europe – also called neolithic expansion
- The background of immigrants who came to Europe from the South-East is still largely unknown

Wikipedia: Neolithic expansion
How it began: Neolithic expansion

- People were classified after the kind of pottery which they produced and used
- The so called Stroked Pottery especially interesting
- At this time (5000-4500 B.C.) many so called circular enclosures were built up in Central Europe
Findings of Stroked Pottery in Bielen
Geographical locations of the findings:
- Hungary, Austria, Slowakia, Saxonia..
- The first enclosure in Thuringia
Facts about neolithic circular enclosures

- 1885 **first discovery** in Krpy (Bohemia, Czech Republic)
- 1919-1924 **first scientific examination** in Zeholfing (Bavaria, Germany)
- 1967 **first complete exposure** in Muehlbach (Austria)

- Assumptions why enclosures were built up:
  - fortress
  - meeting point
  - astronomical observatory

- The openings of the enclosures should be **aligned with points of sunrise or sunset at the solstices**
- Several authors believed that some of the openings are **aligned with points where special stars rise up or go down**
- Scientific research of the last 10 years shows: only the openings of a few enclosures are aligned with **special points in the sky**
Neolithic circular enclosure in Thuringia

- Plans for building a new street in Thuringia required the analysis of magnometer data before construction work starts
Neolithic circular enclosure in Thuringia

- **Short excursion** into measuring the variations in the magnetic field
- Two different possibilities: CS Magnometer and Flux Magnometer
Neolithic circular enclosure in Thuringia

- Short excursion into measuring the variations in the magnetic field
- Figure: Dec 2011, Bielen
Neolithic circular enclosure in Thuringia

- Because of the results of the measurements of the magnetic field it was decided to start exvacations
- The exvacations revealed remains of archeological memorial
- As a consequence, aerial photographs were taken
Neolithic circular enclosure in Thuringia

- Bielen is near Goseck – the world famous neolithic „sun observatory“

  Can we find openings aligned to the points of sunrise and sunset at the solstices?
Geographical conditions 5000 B.C.

- Other findings from this time showed that there were no trees in the neighborhood of the enclosure
- Therefore people had a free view to the nearby mountains
Geographical conditions 5000 B.C.

- The area is flat therefore the astronomical calculations can be simplified
Astronomical conditions

- Effects of atmosphere and celestial mechanics have to be considered:
- **Refraction** caused by the atmosphere when lights go through the air
- **Inclination of the ecliptic**: since the inclination of the ecliptic is not constant, we have to use mathematical models in order to figure out where the sunrise was 7000 years ago (Lasker/2012)
Neolithic circular enclosure in Thuringia

- Geometrical groundplan of the enclosure based on excavations

- Three openings:
  - One directed to the South
  - One directed to the South-East (inclination to north: 129.7°)
Neolithic circular enclosure in Thuringia

- Considering the astronomical and geographical conditions, the point of sunrise at the winter solstice can be determined

- The deviation is only 0.5°
Neolithic circular enclosure in Thuringia

- No clear proof for an alignment to the point of sunset at the summer solstice was found

- Evidence for an orientation to the sunrise at summer solstice were found
Relevance of the neolithic circular enclosure in Thuringia

The enclosure was still relevant for humanity, 2000 years after it was set up. The sanctuary was used as grave.
Late neolithic Bell beaker burials within a 2.5 ky older neolithic circular enclosure

Examinations of late neolithic graves in an area of 100 hectare near Nordhausen (Thuringia, Germany)

Green: Bell beaker culture burial
Red: Corded ware culture burial
Conclusion

- 2000 years after the set up of the enclosure, it was still relevant for humanity. The sanctuary was used as grave.

- The south west opening is directly aligned to the point of sunrise 5000 B.C.

- Evidence found that the builder of the enclosure also knew where the points of sunrise and sunset at the summer solstices were.

- No evidence found that the openings were aligned to points where stars go up or down.

- In the future the whole enclosure will be simulated with the help of 3 D software.
Thank you very much for your attention!