

On Determining the Length of a Ptolemaic Degree

Sven Mildner, 27.04.2025

With the realignment of the *Germania Magna* map according to the *Reinterpretation of Germania Magna* (doi: [10.31223/X5313T](https://doi.org/10.31223/X5313T)), a new value for the length of a Ptolemaic degree simultaneously results.

The following explanation is therefore intended to provide a clearer understanding of the calculation method used to determine the correct value.

For the derivation, we first consider the two rivers that border *Germania Magna* to the east and west, for which Ptolemy recorded the coordinates of their estuary regions into the *Oceanus Germanicus*.

In the east, this is the Oder (*Vistula Fluvius*), with its estuary coordinates:

the mouths of the Vistula river	45°00	56°00
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In the west, it is the Rhine (*Rhenus Fluvius*), for which three different coordinates are given. For the *Germania Magna* map, we select the centrally located estuary:

Western mouth of the Rhine	26°45	53°30
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Central mouth of the river	27°00	53°10
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Eastern mouth of the river	27°20	54°00
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At the same time, we also consider another river to determine whether a longitudinal degree is uniform across the entire extent of *Germania Magna* — that is, whether it has the same value everywhere or whether distortions might exist, suggesting, for example, that the eastern part of the map could have a different scale, or that the map depiction might have been compressed or stretched.

For this purpose, the estuary of the *Albis Fluvius* is suitable:

The mouths of the Albis river	31°00	56°15
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To better illustrate the context, the following maps are roughly aligned vertically, and the corresponding longitudes are drawn (see below), along with the measured distances:

- between *Rhenus Fluvius* and *Albis Fluvius* approximately **115 kilometers**, and
- between *Rhenus Fluvius* and *Vistula Fluvius* approximately **490 kilometers**.

► Rhenus-Fluvius (27°) – Albis Fluvius (31°):

$$31^{\circ} - 27^{\circ} = 4^{\circ} (\cong 115 \text{ kilometers})$$

$$1^{\circ} \cong 115\text{km}/4^{\circ} \approx \mathbf{28.75 \text{ kilometers per Ptolemaic degree}}$$

and between:

► Rhenus-Fluvius (27°) – Vistula Fluvius (45°):

$$45^{\circ} - 27^{\circ} = 18^{\circ} \cong 490 \text{ Kilometer}$$

$$1^{\circ} \cong 490\text{km}/18^{\circ} \approx \mathbf{27 \text{ kilometers per Ptolemaic degree}}$$

► **One Ptolemaic degree is approximately 28 kilometers wide.**

consistent across the entire east-west extent of *Germania Magna*.

If the map had been composed of different sections with varying scales, or if there were significant gaps caused by merging various segments, one would expect much greater discrepancies between the two derived values.

Reverse Calculation:

$(31^{\circ} - 27^{\circ}) \times 28 \text{ km} = 112 \text{ kilometers}$ (longitudinal distance between the Rhine and Albis Fluvius estuaries, measured along the parallel; actual geographic distance is slightly greater due to differences in latitude)

$(45^{\circ} - 27^{\circ}) \times 28 \text{ km} = 504 \text{ kilometers}$ (longitudinal distance between the Rhine and Vistula Fluvius estuaries, measured along the parallel; actual geographic distance is greater due to differences in latitude)

Thus, the longitudinal degrees for *Germania Magna* can be relatively easily recalculated and translated into a modern coordinate system.

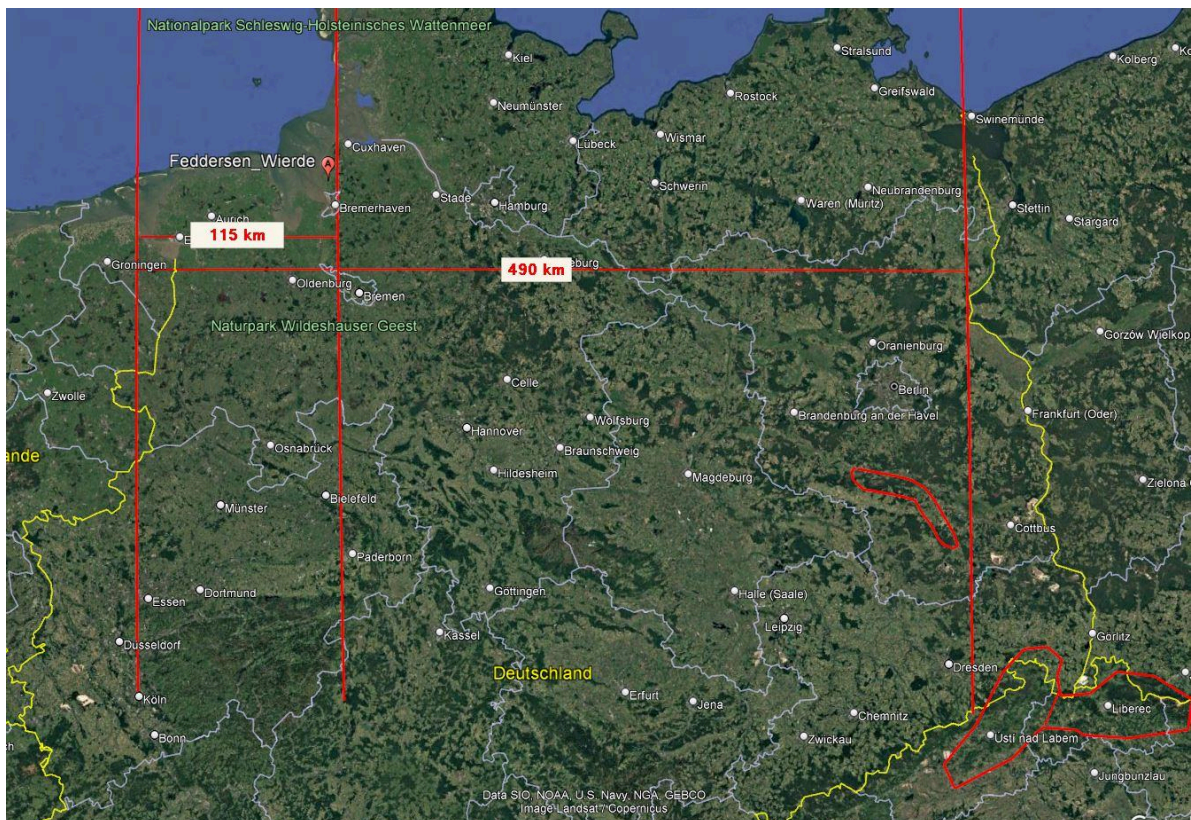
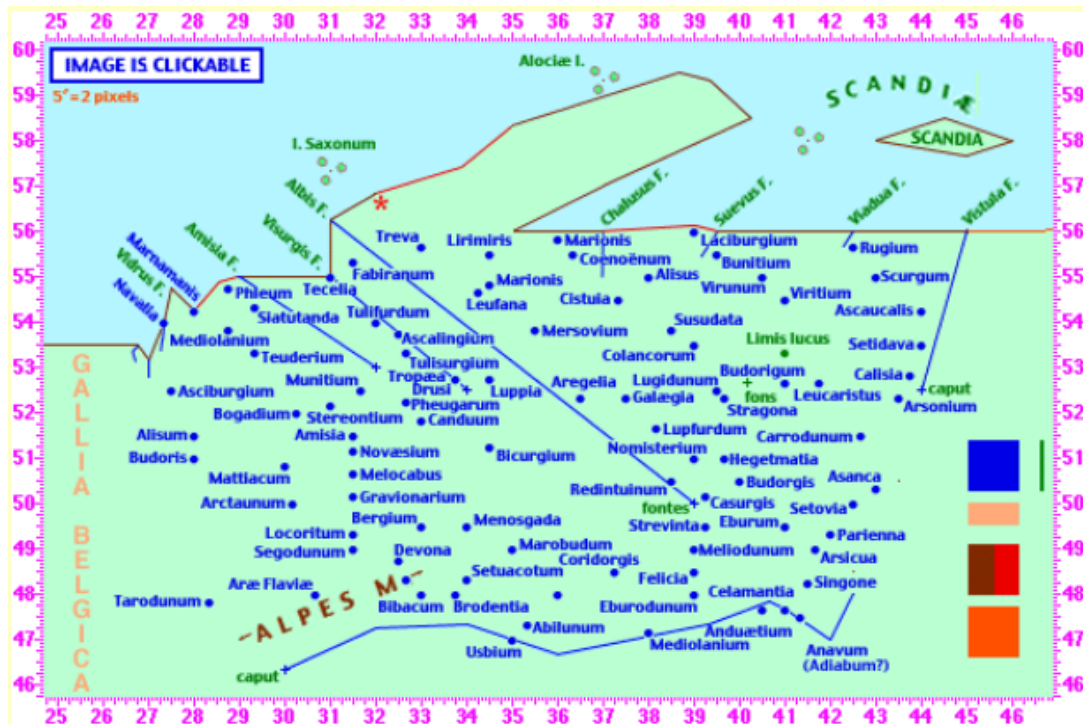


Image Credit for the "Schematic map of ancient Germany according to Ptolemy":
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