Solar angles for Chankillo observatory

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chankillo

Solar observatory at Chankillo, Peru

Methods

Digitizing Site Map

The site map in Figure 2 of Ghezzi and Ruggles (2007) was viewed in MacOS Preview, captured with the MacOS snapshot app, and then the observatory coordinates were digitized using the imageDigitizer R function (Kelley 2020).

To determine scales, it had to be assumed that this diagram was prepared using natural scaling, because otherwise it would not be possible to infer a scale for the northing coordinate.

Although the position of the eastern observation location seemed clear on the diagram, it was not clear exactly where the western one was located. I elected to digitize a point on the main diagram that was in the middle of its inset.

The towers that had been built-up on the ridge are indicated with squares in the original diagram, and rather than try to digitize their corners, I simply digitized one point at the centre of each.

Solstice Indicators

Ghezzi and Ruggles (2007) indicate that declinations that, in this location and at the time 300 BCE, the solar declinations at Summer and Winter solstice were 23.75 and -23.75, respectively. These lines are indicated in the diagram, but the results differ substantially from those in Figures 4 and 5 of Ghezzi and Ruggles (2007), likely indicating an error of the present analysis. Examination of the sun traces indicated on their diagrams suggests that the mislocation is not the result of the fact that the present analysis ignores tower elevation (related to ridge shape). The cause of the mismatch is not yet known.

References

Ghezzi, Ivan, and Clive Ruggles. 2007. "Chankillo: A 2300-Year-Old Solar Observatory in Coastal Peru." *Science* 315 (5816): 1239–43. https://doi.org/10.1126/science.1136415.

Kelley, Dan. 2020. "Dankelley/imageDigitizer." https://github.com/dankelley/imageDigitizer.

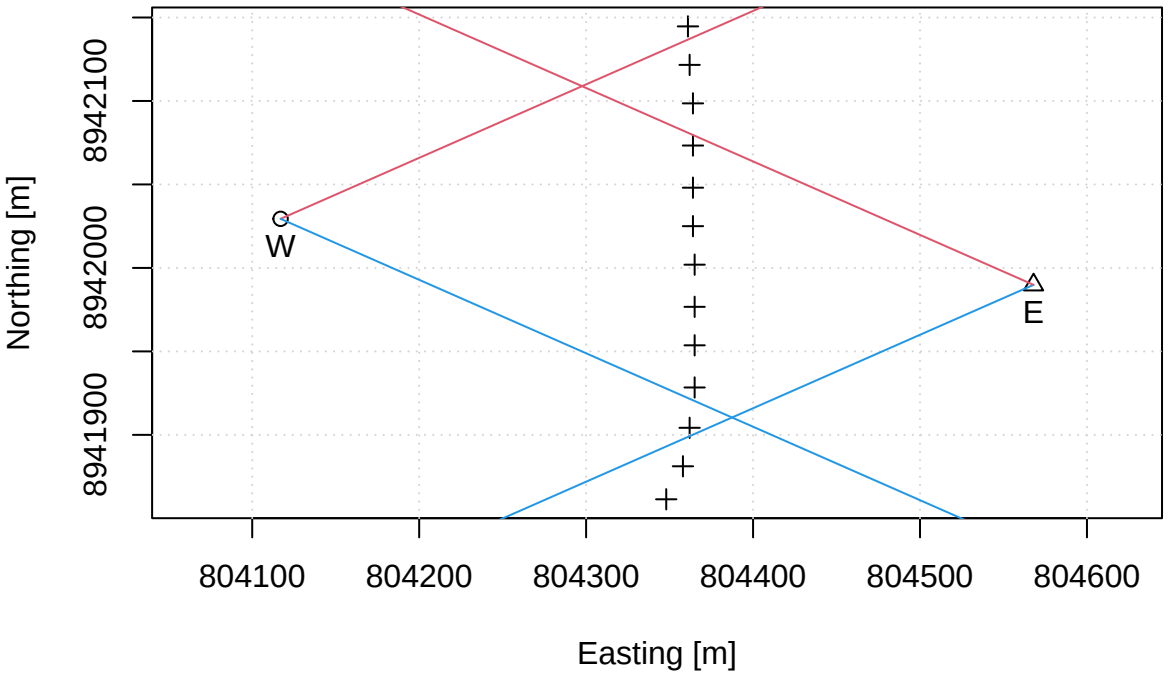

Figure 1: Figure 1 site map, with solstice siting lines. The Western and Eastern observation locations are indicated with labelled circle and triangle, respectively, and the crosses indicate the centres of the ridge towers. The red lines indicate sunrise and set locations at the June solstice and the blue lines indicate the same, for the December solstice.