EXAMPLE 1: TOTAL SOLAR ECLIPSE. AD 418, July 19
This eclipse was collected in numerous no contemporary European chronicles from Austria, Denmark, Germany, France… in many cases only reference is made to the darkening of the sun in broad daylight with or without mentioning the date. Other more complete records include the time of day the event took place. For these records, we must bear in mind that the procedure is usually appears when we deal with Medieval sources: non-contemporary authors were limited to copying records of other authors prior to them, for main prestige reasons. See [3], [6] for a further study.

Anyway, some contemporary authors such as Hidatius, from Northern Spain and Philostorgius from somewhere near Istanbul, provide valuable and more detailed data.

http://www.tertullian.org/fathers/philostorgius_fr.html#218

When Theodosius had entered the years of his boyhood, on the 17th of a July, a little after noon-day, the sun was so completely eclipsed that the stars appeared; and so great a drouth followed on this eclipse that a sudden mortality carried off great multitudes both of men and of beasts in all parts. Moreover, at the time that the sun was eclipsed, a bright meteor appeared in the sky, in shape like a cone, which some persons in their ignorance called a comet (…) For it arose first in the east, just where the sun rises at the equinox, and then passing across the lowest star in the constellation of the Bear crossed gradually over to the west (…) it at last length disappeared, after it had continued its course for more than four months. Its apex, moreover, at one time rose up to a height and narrow point, so that the meteor exceeded the length and shape of a cone, while at another time it returned to that particular form (…) At the same time with the earthquakes, fire came down from the skies, which seemed to banish all hope of escape; however, it caused no destruction of life, for the mercy of God sent a violent wind which scattered the fire in every direction, and at length drove it into the sea. Then a new and strange sight was to be seen, the waves of the sea burning in the day-time, like woods and forests, and at length the flames were extinguished in the waters.

This is a typical fragment containing astronomical material in a narrative source. There is no scientific intent, although scientific data can be extracted and the culture of the epoch can be inferred from the calamities that the author attributes to these phenomena. The mentioned eclipse of the sun apparently must have been total since the author mentions that stars were seen in broad daylight, the day is correctly indicated and the year can be obtained from the context, in addition to the fact also mentioned, of the presence of a comet identified as C/418 M1. The historical discussion of the context, author and how the identifications of the phenomena were carried out exceeds the objectives of the poster.

The next problem when we have an observation made from several points is that the parameters that are calculated are compatible with all of them. For example, assuming that the observation of Philostorgius was made from Istanbul, we would obtain a 6800 < ΔT < 9000, which would have meant that the eclipse had not been total in Braga (Portugal), from where the other contemporary observation (by Hidatius) came. Another possibility was raised by Newton [3], who proposed Borissus (36°42°E 39°54°N) as the place of observation and this makes sense, because this was where Philostorgius was born. However, as we have said, it is not our intention to enter into historical context reasoning, but Istanbul as the observational place seems to be the most likely.

REFERENCES:

The result obtained is seen in the date of Figure 3. The solid red and blue lines correspond to the splines obtained Morrison and Stephenson [2] and Stephenson et al. [7], respectively. The black line is the spline obtained using our results showing a significantly lower ΔT than the one provided by other authors for the time considered.

DISCUSSION: To obtain preliminary results we have worked with a total of 43 observations included in the AD418-AD693 period and coming from both Asia and Europe and North Africa. Among them are eclipses of the Sun, Moon and occultations of planets by the Moon. Each observation has been examined separately, calculating a new interval of ΔT for which the characteristics of the phenomenon have been taken into account, if it was observed in a single place or in multiple places, the time interval in which it could be observed, in the event that it occurs near sunrise or sunset, etc.