

## Historical halo displays as past weather indicator

Dagmar Neuhäuser (1) and Ralph Neuhäuser (2)

(1) independant scholar, Schillbachstr. 42, Jena, Germany (dagmarneuhaeuser@yahoo.de), (2) University Jena, Astrophysics, Jena, Germany (rne@astro.uni-jena.de)

Certain halo displays like the  $22^\circ$  circle were known to indicate specific weather pattern since millennia - as specified in Babylonian omnia, Aristotle's Meteorology, farmers' weather lore, etc. Today, it is known that halo phenomena are due to refraction and reflection of sun and moon light in ice crystals in cirrus and cirrostratus, so that halo observations do indicate atmospheric conditions like temperature, humidity, pressure etc. in a few km height.

The Astronomical Diaries of Babylonia have recorded both halo phenomena (circles, parhelia, etc.) and weather conditions (rain, clouds, etc.), so that we can use them to show statistically, whether, which and how fast halo phenomena are related to weather - for the last few centuries BC for Babylonia.

We can then also compare the observations of Babylonian priests in the given BC epoch (without air and light pollution) with the last few decades of the modern epoch (with air and light pollution), where amateur halo observers have systematically recorded such phenomena (in Europe).

Weather and climate are known to be partly driven by solar activity. Hence, one could also consider whether there is an indirect relation between halo displays as weather proxy and aurorae as solar activity proxy - if low solar activity leads to low pressure systems, one could expect more halos, preliminary studies show such a hint. For the last few decades, we have many halo observations, satellite imaging of the aurora oval, and many data on solar activity. A statistically sufficient amount of aurora and halo observations should be available for the historic time to investigate such a possible connection: halos were recorded very often in antiquity and the medieval times (as found in chronicles etc.), and modern scholarly catalogs of aurorae also often contain unrecognized halo displays.