

6.2: Altazimuth Coordinates

In figure VI.1 we see the celestial sphere with the observer O at its centre. The point immediately overhead, Z, is the *zenith*. The point directly underneath, Z', is the *nadir*. The points marked N, E, S are the *north*, *east* and *south points of the horizon*. The west point of the horizon is behind the plane of the paper (or of your computer screen) and is not drawn. The great circle NESW is, of course, the *horizon*.

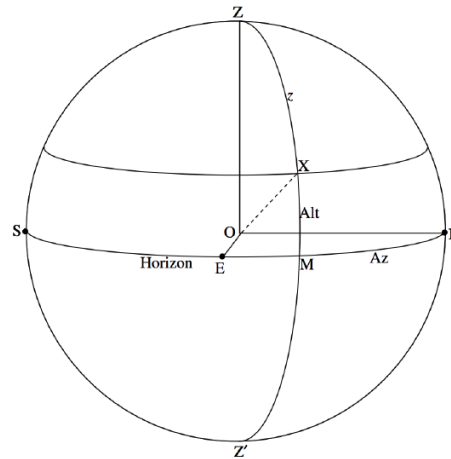


FIGURE VI.1

Any great circle passing through Z and Z' is called a *vertical circle*. The vertical circle passing through S and N, the south and north points of the horizon, is the *meridian*. The vertical circle passing through the east and west points of the horizon (which I have not drawn) is the *prime vertical*. X is the position of a star on the celestial sphere, and I have drawn the vertical circle ZXMZ' passing through the star. The angle MX is the *altitude* of the star (also referred to in some contexts as its “elevation”). The complement of its altitude, the angle z , is the *zenith distance* (also called, not unreasonably, the “zenith angle”).

A small circle of constant altitude – i.e. a small circle parallel to the horizon – has the curious name of an *almucantar*, and I have drawn the almucantar through the star X. An almucantar can also be called a parallel of altitude.

The angle NM that I have denoted by Az on figure VI.1 is called the *azimuth* (or “bearing”) of the star. As drawn on the figure, it is measured eastwards from the north point of the horizon. This is perhaps the most common convention for observers in the northern hemisphere. However, for stars that are west of the meridian, it may often be convenient to express azimuth as measured westwards from the north point. I don’t know what the custom is of astronomers who live in the southern hemisphere, but it would not surprise me if often they express azimuth as measured from the south point of their horizon. In any case, it is important not to assume that there is some universal convention that will be understood by everybody, and it is *essential* when quoting the azimuth of a star to add a phrase such as “measured from the north point eastwards”. If you merely write “an azimuth of 32 degrees”, it is almost certain that you will be either misunderstood or not understood at all.

In the altazimuth system of coordinates, the position of a star is uniquely specified by its azimuth and either its altitude or its zenith distance.

Of course the altitude and azimuth of a star are changing continuously all the time, and they are also different for all observers at different geographical locations.

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