

**Sampling procedures and samples preparation
adopted at the Laboratory of Palaeomagnetism
of the *Universidad Complutense de Madrid***
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In this document the sampling procedures and the sample preparation adopted at the *Universidad Complutense de Madrid* are described.

Different orientation procedures are used depending on the sampling techniques adopted. The procedures differ for samples cored with a portable drill and for block hand-samples.

Samples cored: cylindrical sample (d= 2.54 cm) are collected using a portable gasoline-powered core drill. At first we drill the outcrop to a depth of 5-10 cm, depending on the material involved and on its conditions. Then, while the sample is still attached to the outcrop at its base, the core is oriented. Using an inclinometer pipe, the angle between the drill direction, taken as the Z-axis of the sample (fig.1) and the horizontal plane is measured. This is the *dip angle* of the Z-axis, ranging between 0 and 90 degrees.

The X-axis lies on the vertical plane together with the Z-axis, and points upward. The *azimuth* of the horizontal projection of the X-axis is measured clockwise from geographic north with a magnetic compass.

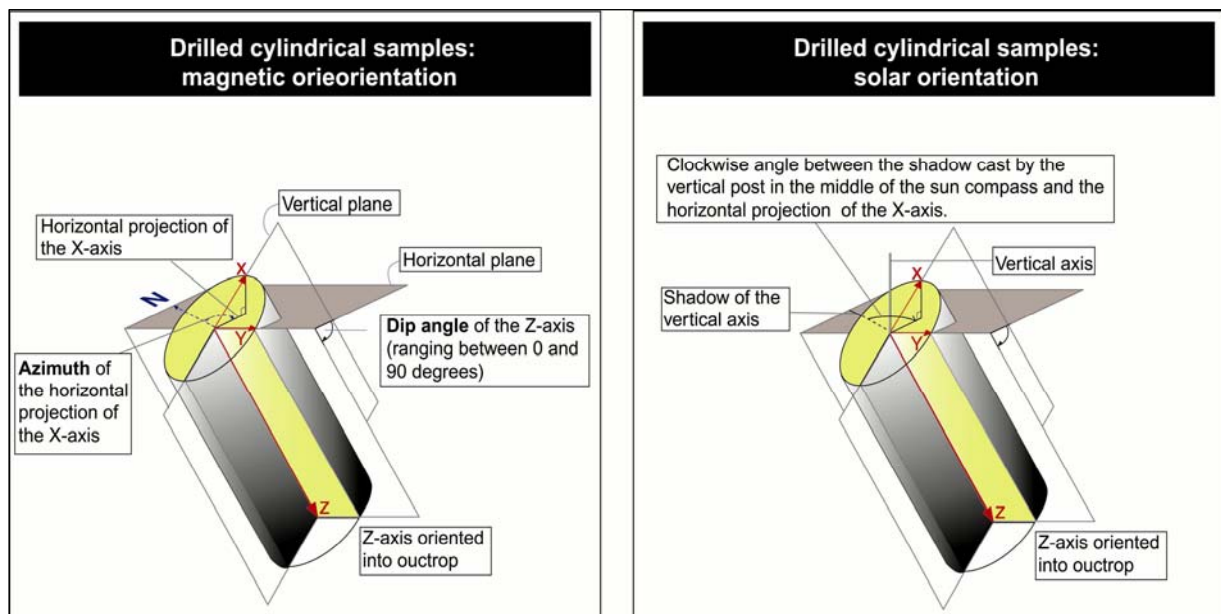


Fig.1 Orientation scheme for drilled samples

The angle between the horizontal projection of the X-axis and the shadow of the sun is also measured with a sun compass.

The Y-axis lies into the horizontal plane at a right angle from the X- and Z- axes. The direction of the Y-axis is established at 90 degrees measured clockwise from the horizontal projection of the X-axis.

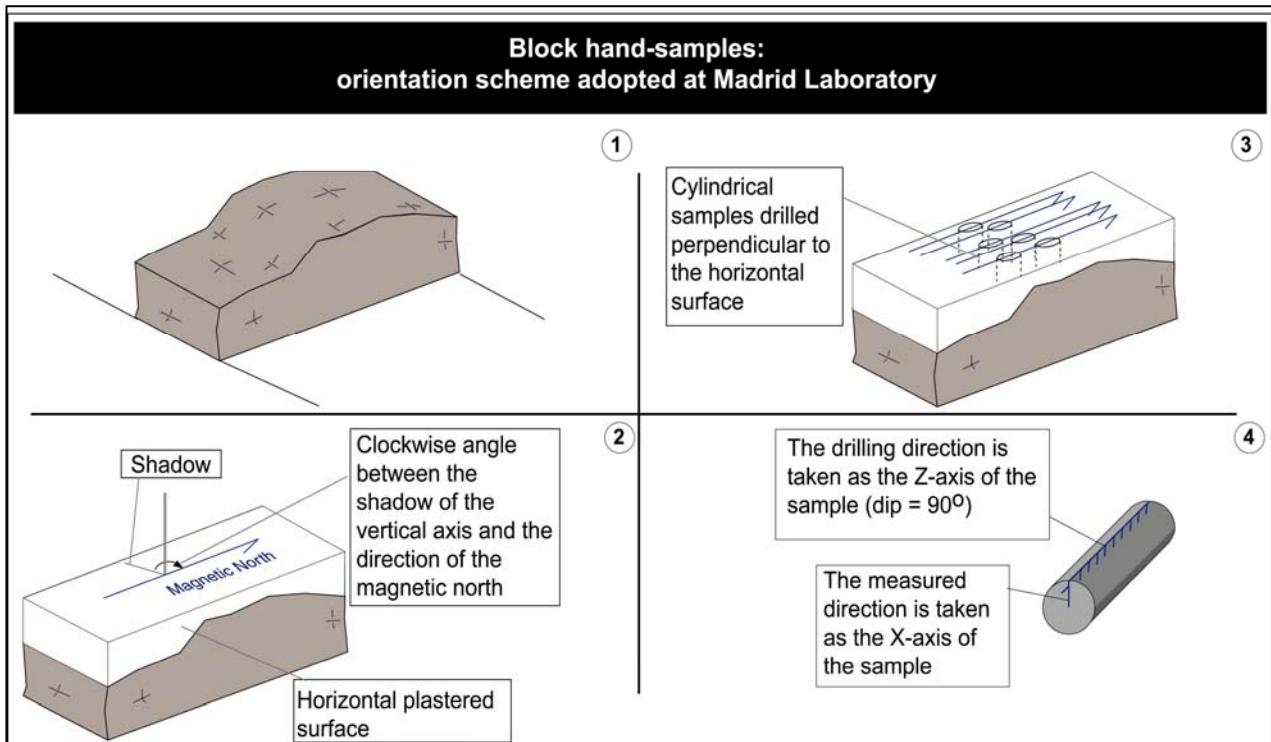


Fig.2 Orientation scheme for block hand-sample

Block hand-samples: in order to carry out solar and magnetic orientation a horizontal plastered surface is prepared on the block sample. The direction of magnetic north is drawn on the horizontal layer and the clockwise angle from the sun's shadow to magnetic north is measured with a sun-compass (fig.2). The coordinates of the site are measured with a GPS and the required calculations for the sun-orientation are done using the software from Mark. W. Hounslow, *Palaeomagnetic Tools*.

The reliability of the magnetic orientation is confirmed when it coincides with the solar orientation.

The block sample is drilled in the laboratory perpendicular to the prepared surface. The direction drawn on the surface is taken as the X-axis, and the drilling direction as the Z-axis (dip= 90°).

Sampling preparation: poorly consolidated block hand-samples require consolidation before drilling. In Madrid we use an ethyl-silicate consolidator (commercial name *Silbond 40*). The consolidation procedure consists of 2 steps; a) completely immersing the block in the consolidator for approximately 24 hours. This time may vary depending on the porosity of the block sample. b) withdrawing the block and leaving it to dry (in air, at ambient temperature) for a period of up to 2-3 days, depending on the block and ambient conditions. Once dry, the block is ready for drilling/cutting.