

Paleomagnetic Standards

Paleomagnetic Standards Measurements

Updated 2/19/20

Paleomagnetic standards were provided by Lisa Tauxe to confirm instrument measurements are correct. The standards were prepared specifically for the SRM although they can be used in the other instruments as well. These standards were prepared and measured at S10 in California. Standards are kept in a cardboard box (figure 1) and stored in the Pmag lab in the smaller MU metal shielding chamber (figure 2).

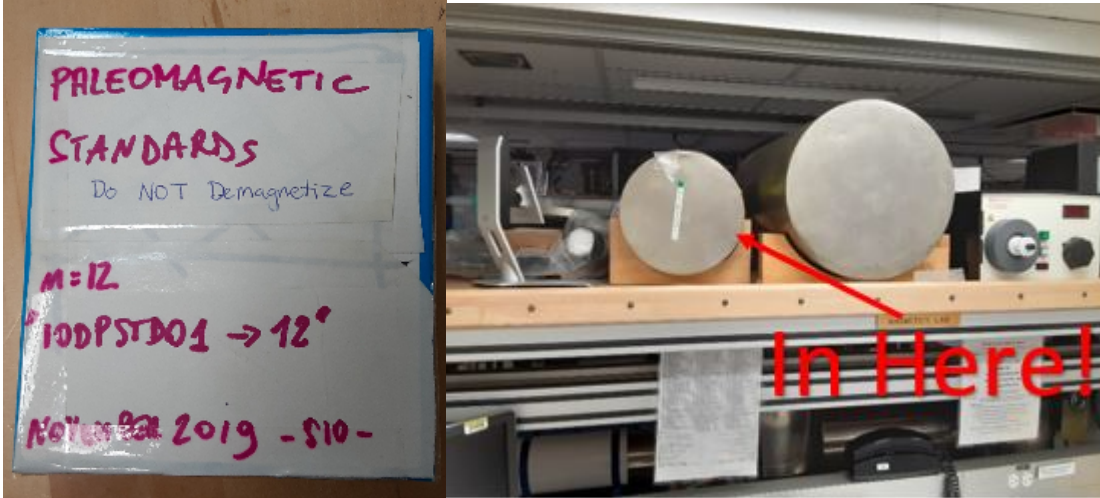


Figure 1 Paleomagnetic Standards Figure 2 Standards Location

Table 1 contains the values of the standards as they were measured in California before receipt by IODP. Note that the units of intensity in the provided values was in *emu*. Intensity has been converted to *A/m* as this is the unit used by IODP instruments. The conversion used was $10^{-1} \text{ A/m} = 10^{-3} \text{ emu}$. It is extremely important that these standards **do not get demagnetized**. Be sure to stress this to anyone who may use the standards.

Table 1 Paleomagnetic Standards Values

Sample Name	Declination	Inclination	Intensity (A/m)	csd
IODPSTD01	217.4	33.9	3.17E-01	0.9
IODPSTD02	134.2	35.5	8.48E-02	0.8
IODPSTD03	143.5	-29.1	9.40E-02	1.3
IODPSTD04	227.5	-22	6.36E-02	0.1
IODPSTD05	18.9	-24.9	9.09E-02	0.4
IODPSTD06	137.6	28.2	4.20E-01	0.5
IODPSTD07	326	34	5.86E-01	0.7
IODPSTD08	221.8	-12.2	7.82E-02	0.6
IODPSTD09	34.7	-28.4	1.13E-01	1
IODPSTD10	316.2	-19.8	6.39E-02	0.4
IODPSTD11	333.3	24.3	9.78E-02	1
IODPSTD12	28.4	40.2	1.96E-01	0.4

Standard Orientation

The Samples are oriented as if they were taken from an archive half. This can be confusing as most of the time, discrete samples would be collected from the working half. Be sure to keep this orientation in mind when loading into the instruments. See Figure 3 for sample orientation arrows



Figure 3 Cube Orientation for Standards

Measuring in the SRM

When measuring the standards in the SRM, install the discrete sample tray and set up your measurement preset to reflect a discrete J-Cube collected from the archive half. For sample shape select *Discrete J-Cube*. Face orientation should be *Top* and the Arrow Orientation (-Z) should be set to *Away*. Be sure to select *Archive Half* under From Section. In Dimensions, set the sample area to 7.0 cm^2 . Although this says *sample area* and the unit is an area unit, we are telling IMS what the volume of the J-cube is (i.e. 7.0 cm^3). Name your measurement preset something useful such as *Discrete Archive*. More information on setting up a sample preset can be found in the SRM user guide.

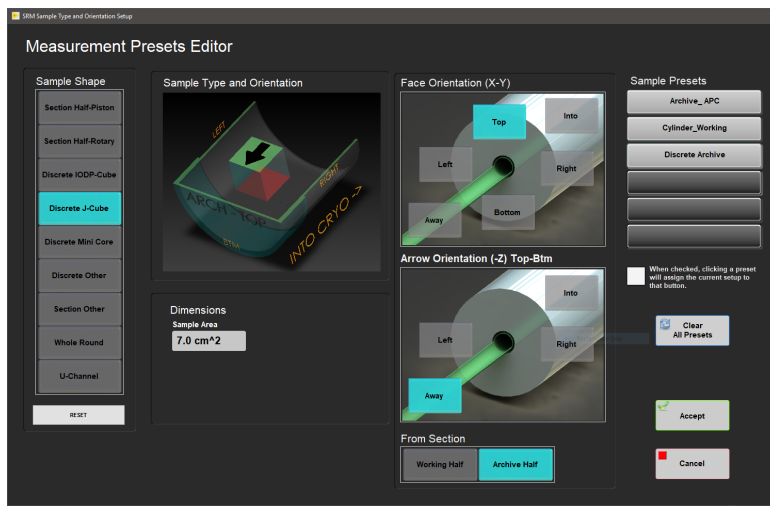


Figure 4 Measurements Preset Editor for Archive Half J-Cube

Run a discrete tray background then load the standards into the discrete sample tray as shown in Figure 5. As with typical discrete measurements, load the first standard into the 13 cm offset position and leave a blank position between each standard cube (i.e. load standards into positions 13 cm, 33 cm, 53 cm...). The standard cube should be oriented so that the $-Z$ arrow is pointing away from the SRM and the $+X$ arrow is pointing up.

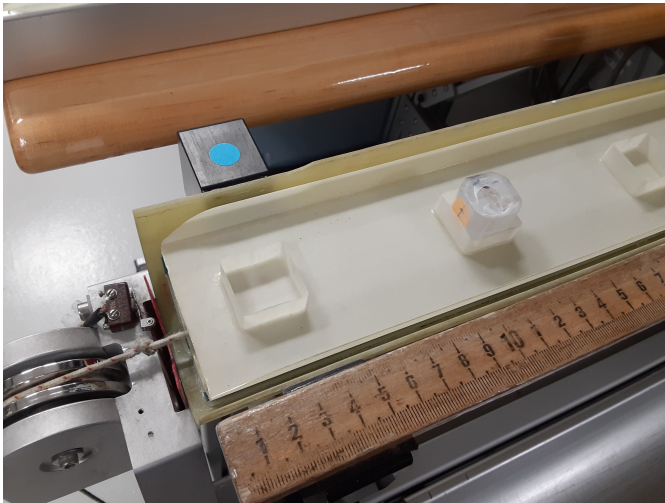


Figure 5 Loading Standards into Discrete Tray

In IMS, click *start* which will bring up the screen shown in Figure 6. Under sample type and orientation, select the measurement preset you set up for archive half discrete cubes. A diagram should appear in the lower left corner depicting how the sample should be oriented in the sample tray. Double check that the orientations match.

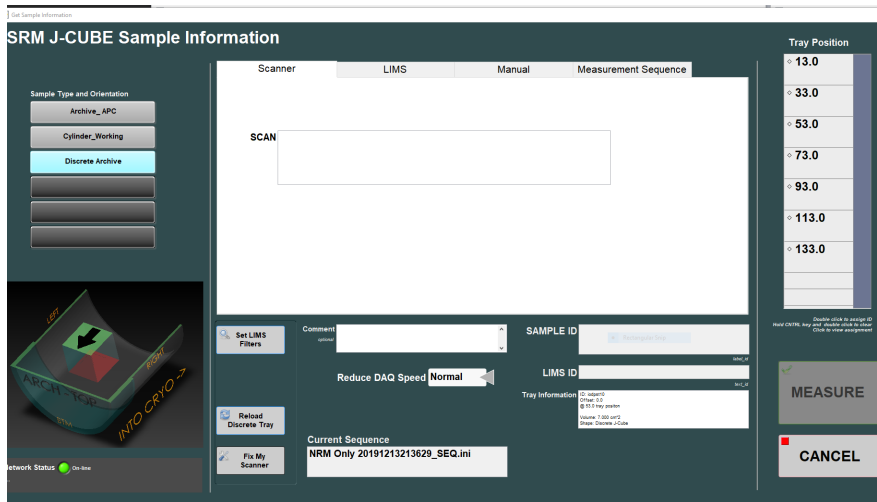


Figure 6 Entering Sample Information

This next step is very important!!! In the measurement sequence tab, select a measurement sequence that measures NRM only. Do not select a sequence that demagnetizes the samples first or they will be ruined and worthless. The *Current Sequence* box at the bottom of the screen should have a sequence such as NRM only.

Use the manual tab to enter the name of the standard cube, click *use me*, then double click on the tray position this cube is sitting in to assign their positions. Once all standards cubes are assigned to their position, click *Measure*.

When the measurements are complete, the data will go to the *In* folder. This data cannot be uploaded with MUT. Move the *.dsc* files out of the *//* folder and save them in: *V:\VODP_Share\PMAG_Documents\SRM\PMag Standards*

Open the *.dsc* file with a text editor. Under the Header *<MUL T1>*, scroll to the far right. You are looking for the values *inclination_w_bkgrd_w_drift*, *declination_w_bkgrd_w_drift*, and *intensity_w_bkgrd_w_drift*. These are your background and drift corrected values that you can compare to the listed values of the standards. Record the values in the laboratory notebook.

