

EDITS IN PROGRESS: Paleomagnetic Standards

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Paleomagnetic Standards Measurements

TO UPDATE (8/24/2022)

Last Updated 2/4/22

Scripps Institute for Oceanography Standards (TO UPDATE)

Paleomagnetic standards (IODPSTD01 through IODPSTD12) were provided by Lisa Tauxe to confirm instrument measurements are correct. The standards were prepared specifically for the SRM. **Do not measure them in the JR-6 spinner.** These standards were prepared and measured at Scripps Institute for Oceanography 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).

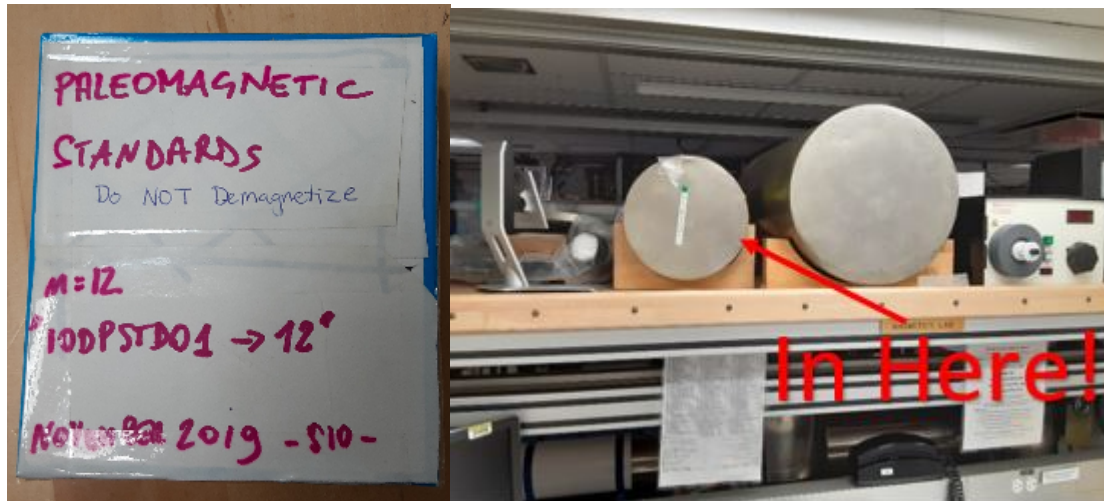


Figure 1 Paleomagnetic Standards Figure 2 Standards Location

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* and the volume used was 1cc. Intensity has been converted to *A/m* as this is the unit used by IODP instruments and the intensity has also been listed if you assume a 7cc volume. 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 from Scripps

Sample Name	Text ID	Declination	Inclination	Intensity (A/m) as provided (assumes 1cc)	Intensity (A/m) assuming 7cc volume	csd
IODPSTD01	CUBE11242251	217.4	33.9	3.17E-01	4.529E-02	0.9
IODPSTD02	CUBE11242261	134.2	35.5	8.48E-02	1.211E-02	0.8
IODPSTD03	CUBE11242271	143.5	-29.1	9.40E-02	1.343E-02	1.3
IODPSTD04	CUBE11242281	227.5	-22	6.36E-02	9.086E-03	0.1
IODPSTD05	CUBE11242291	18.9	-24.9	9.09E-02	1.299E-02	0.4
IODPSTD06	CUBE11242301	137.6	28.2	4.20E-01	6.00E-01	0.5
IODPSTD07	CUBE11242311	326	34	5.86E-01	8.371E-02	0.7
IODPSTD08	CUBE11242321	221.8	-12.2	7.82E-02	1.117E-02	0.6
IODPSTD09	CUBE11242331	34.7	-28.4	1.13E-01	1.614E-02	1

IODPSTD10	CUBE11242341	316.2	-19.8	6.39E-02	9.129E-03	0.4
IODPSTD11	CUBE11242351	333.3	24.3	9.78E-02	1.40E-02	1
IODPSTD12	CUBE11242361	28.4	40.2	1.96E-01	2.80E-02	0.4

Standard Orientation

The Samples are oriented as if they were taken from an archive half. This means that the arrow etched into the cube points in the negative Z (i.e. towards the top of the core) on the **ARCHIVE HALF SPLIT FACE** (not the working half split face as a cube normally collected onboard would be). This can be confusing as most of the time, discrete samples would be collected from the working half. The arrow on the orange dot sticker points in the positive X direction of the IODP coordinate system. 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

The QAQC Text_ID created for IODPSTD01 to IODPSTD12 considers the samples as they were taken from the **WORKING HALF**. Put the sample upside down in the discrete tray in the position WTA, top away (arrow of the cube away from the SRM) and +X down.

Sample Name	Text ID	Declination	Inclination	Intensity (A/m) assuming 7 cc volume	
IODPSTD01	CUBE11242251	209.5	34.1	4.27E-02	
IODPSTD02	CUBE11242261	143.8	25.9	1.45E-02	
IODPSTD03	CUBE11242271	147.5	-23	1.69E-02	
IODPSTD04	CUBE11242281	209.8	-14.4	1.01E-02	
IODPSTD05	CUBE11242291	10.6	-51.1	7.31E-03	
IODPSTD06	CUBE11242301	132	27.6	6.03E-02	
IODPSTD07	CUBE11242311	310.2	34.5	7.44E-02	
IODPSTD08	CUBE11242321	211.6	-11.8	1.08E-02	
IODPSTD09	CUBE11242331	31	-30.6	1.38E-02	
IODPSTD10	CUBE11242341	303.7	-12.7	8.22E-03	
IODPSTD11	CUBE11242351	321.2	31.3	1.34E-02	
IODPSTD12	CUBE11242361	14.9	48.3	2.52E-02	

Table 2. IODP Standards created by Scripps measured with the SRM onboard the JR. Declination, inclination and intensity are corrected from background and drift (April 18, 2022). Volume is 7 cc. No duplicate measurement.

IODP created Standards

Because the standards provided by Lisa Tauxe at Scripps were not designed to be used in the JR-6, 4 new standards were created which can be used in the JR-6. A strip of magnetic tape was glued to a stick which is secured inside a J-cube. The standards were then given an IRM and measured in the JR-6 followed by the SRM. **These standards are oriented as if they were collected from a working half with an assumed volume of 7cc**. Each standard was measured 20 times. The process included inserting and removing the standard between each measurement. The mean intensity was calculated as well as Fischer stats for inclination and declination. See table below.

Sample Name	TextID	Int ($\times 10^{-3}$ A/m)	Stdev ($\times 10^{-3}$ A/m)	Geo Dec ($^{\circ}$)	Geo Inc ($^{\circ}$)	95 ($^{\circ}$)
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IODPSTD13	CUBE11242371	41.41	0.05	309.4	-11.1	1197	0.9
IODPSTD14	CUBE11242381	47.75	0.06	329.0	-33.0	565	1.4
IODPSTD15	CUBE11242391	27.43	0.04	263.2	31.5	354	1.8
IODPSTD16	CUBE11242401	14.91	0.03	274.0	34.6	4062	0.5

Table 2. IODP standards measurements in JR-6

Measuring in the SRM (TO UPDATE)

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 1.0 cm². 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. 1.0 cm³). 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.

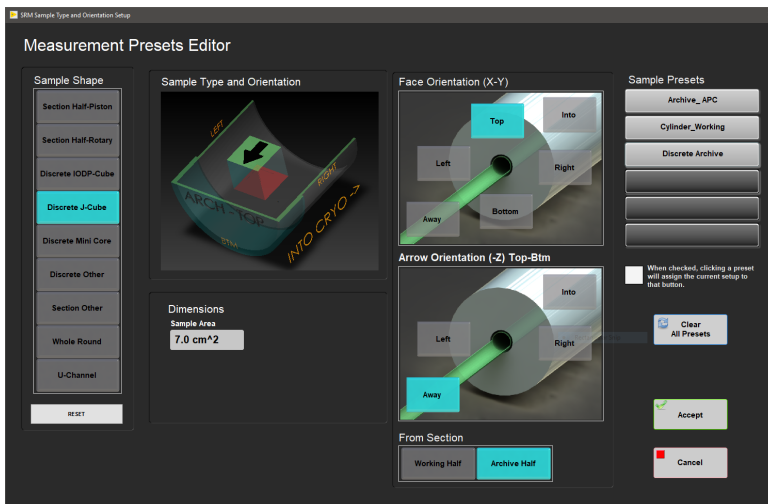


Figure 4 Measurements Preset Editor for *Archive Half J-Cube*

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.

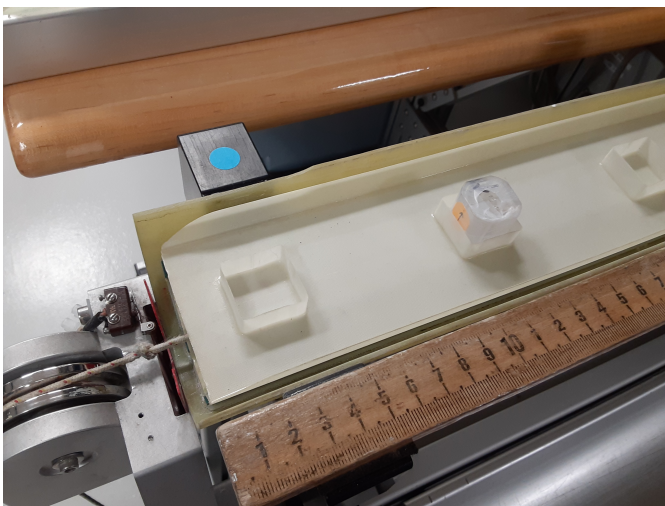


Figure 5 Loading Standards into Discrete Tray

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.

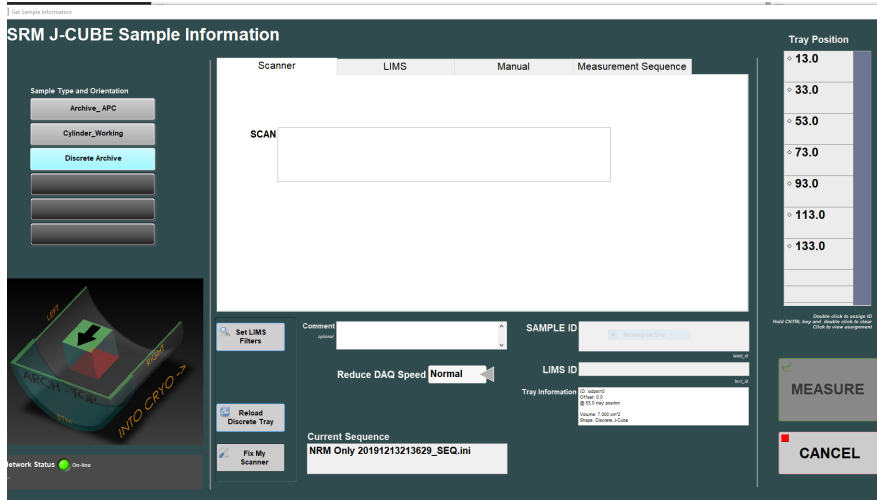


Figure 6 Entering Sample Information

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 and can then be uploaded to LORE.

Measuring In the JR6

Do not measure the standards created at Scripps (IODPSTD01 through IODPSTD12) in the JR6. Load the standard into the automatic sample holder with the up arrow that is etched into the cube body facing up and to the left, as shown in figure 7. Be sure that sample type is set to cube in *instrument configurations*. Use a volume of 7cc. Use 0 for the azimuth and 90 for the dip. With these settings, you will look at the geographic inclination and declination (not specimen coordinates).

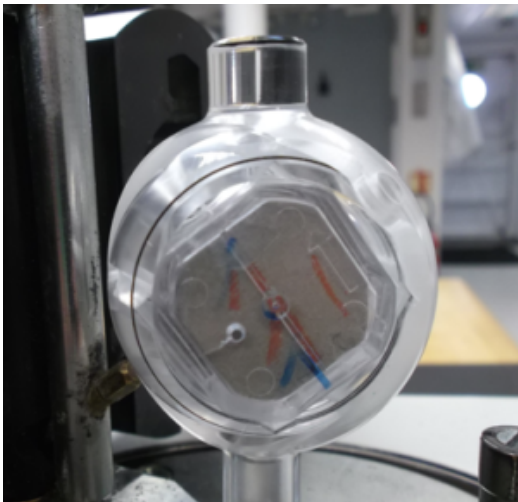


Figure 7. Standard loading position for JR-6 automatic sample holder

Viewing the Data **(TO UPDATE)**

All of the standards have been given a LIMS text ID so they can be scanned and the data uploaded to the database. The data can be viewed in LORE by selecting QAQC in the Expedition drop down, CORELAB as site, MAGNETICS for hole.

Archive Versions:

- [PaleomagneticStandards_exp378.pdf](#): PDF version of this wiki page as of 2020-02-24