



Experiment number: [PIC 202257](#)

Date archive has been updated: [December 21, 2023](#)

This archive has been updated according to the attached announcement to this report.

**Network Code: 4L.2020**

**Assembled ID: 22-016**

Archive type:

- PH5

Implemented changes:

- Z-dip has been updated from +90 to -90

Where the correction was implemented in the archive:

- PH5 master (PH5)

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Version #	20231120
Publish Date	2023-11-20

**Announcement Title:**

SmartSolo archives flipped polarity (IGU-16HR 3C 5Hz)

**Announcement Content:**

Dear EarthScope Community and PASSCAL PIs:

In September of 2023 we discovered that SmartSolo node (IGU-16HR 3C, 5Hz) data archived from PASSCAL experiments has a non-standard polarity on the Z-channel relative to the down-positive industry geophone convention. Details of this discovery and the steps that will be taken to correct this discrepancy, which will affect the existing and future archives, are outlined below.

**Issue**

The expected polarity for data archived from PASSCAL experiments are as follow:

- Broadband seismometer – Up (Z-dip = -90), North and East motion produce a positive polarity.
- Geophone – Down (Z-dip = +90), North and East motion produce a positive polarity

Data archived, both PH5 and SEED, prior to October 05, 2023 from PASSCAL experiments using the SmartSolo nodes have the following polarity and metadata mismatch:

- Up (Z-dip = -90), North, and East motion produce a positive polarity
- SmartSolo 5Hz geophone Z-channel metadata incorrectly describes the existing timeseries polarity. i.e. The data are Z-dip = -90 and the metadata are Z-dip = +90.

**Corrective Measures**

We will take the following steps to correct the existing archives (October 05, 2023 and prior):

- Metadata for all SmartSolo archives will be updated to accurately reflect the polarity of the associated Z data. This means Z-dip will be updated from +90 to -90.
- The timeseries data will not be corrected; meaning already-archived data will remain as-is, and retain up-positive polarity (Z-Dip = -90), matching that of the updated metadata.
- A report will be attached to all affected and edited archives for future users to be aware of this convention.

## Future Archives

We will take the following steps when archiving future SmartSolo node experiments (Effective October 05, 2023):

- All SmartSolo data will be archived using the down-positive industry convention for geophones regardless of archive format.
- Metadata will correctly describe a Z-dip of +90.

## Note

- Only SmartSolo Z-channel data is affected. Existing metadata correctly describes the horizontal channels of all SmartSolo experiments, and Fairfield archives are wholly unaffected.
- Sensors (also referred to as geophones) with industry standard conventions in the PASSCAL pool of equipment are: L-22, L-28/Y-28, Sercel 40Hz, and all-in-one units; Fairfield ZLand 3C nodes and SmartSolo IGU-16HR 3C

## **Signature:**

EarthScope Primary Instrument Center