Proposed action: Create/publish OBS data/metadata standards

- History:
  - 2013 (Goteburg)
    - Discussion of whether FDSN should coordinate OBS standards
  - 2016 (mailing list):
    - W Crawford sends out OBS data/metadata strawman proposal
  - 2017
    - (Kobe): Discussion of details in strawman proposal
    - After Kobe: strawman proposal changed to versioned documentation (last update: 2022-03)
  - 2018 (SERA project):
    - Deliverable 4.2 (“Report on metadata challenges and proposed solutions”) includes Appendix on Ocean Bottom Seismometers including relevant fields from strawman proposal

Proposed action: Create/publish OBS data/metadata standards

- Goal:
  - Publish all elements on permanently accessible sites where they can be found, implemented, and updated if necessary

- Separate document sections into different objects:
  - Online, versionable guides
    - Recommendations for data/metadata preparers
    - Guide for data users
    - List of software for post-processing OBS data
  - Additions to FDSN documents
    - Data and metadata (StationXML) element requests for FDSN

Recommendations for data preparers

Subject	2016	2023
Clock corrections	Apply linear drift corrected clock correction to each record header: fields 8, 12,14, 17, and set data quality to 'Q' Set data quality to 'D' if correction not applied	Added non-linear clock correction, *recommend no correction for low-frequency channels?* *Add possibility for resampled data (code?)*
Leap seconds		*Specified protocol for adding leap seconds to data*
Pressure instrument names	Hydrophone = *DH deep-ocean differential pressure gauge = ?DF absolute pressure gauge = ?TZ?	*DH **DG (new code)* *DO
Channel Orientation codes	Non-oriented horizontals: "N"->"1", "E"->"2".	Same + Vertical with positive = down -> "3"
Site names for repeated deployments	Use incrementing alphanumeric characters at the end of station names (IRIS standard)	
Processing information	Document processing steps, possibly in "opaque" miniSEED files	Use structured text files (JSON preferred)

Recommendations for metadata preparers

Subject	2016	2023
Pressure instrument names	Same as in data	
Channel Orientation codes	Same as in data	For channel “3” (vertical with positive=DOWN), set dip to “-90”
Dip/azimuth specifications	Set azimuth of non-oriented horizontal chans to “0”	- Set horizontal azimuths to “0” and “90” (1 and 2), uncertainties to “180” - Set pressure gauges dip to “90” for voltage negative for positive pressure, -90 otherwise
Site names for repeated deployments	Same as in data	
Specify expected data length	Asked for specific StationXML field	Use existing “CreationDate” and “TerminationDate” fields?
Processing information	Same as in data	
Timing correction	Indicate in JSON-formatted “Comment”	*Recommend structure/elements* *Use BaseNodeType (Network, Station or Channel) element with custom namespace?* *Also specify specification language for leap-seconds*

Data requests for FDSN

Subject	2016	2023
Clock corrections	Allow 64-bit sampling rate presentation	- miniSEED3 includes 64-bit sampling rate - IS THIS A GOOD IDEA? (use with software, other stations)
Allow versioning		- miniSEED3 data quality codes replaced with version codes - (but how to specify uncorrected vs corrected? 2 & 3+?)

Metadata requests for FDSN (StationXML)

2016	2023
Add water level	v1.1 “WaterLevel” element
Add measurementMethod string	v1.1 FloatWithUncertainty “measurementMethod” element
Add way to specify data recovery/loss	Use existing “CreationDate” and “TerminationDate”?
Add “CommentList” element for related comments	Rejected, but v1.1 added “Subject” attribute for related comments
Allow versioning	???

User Guide

Subject	2016	2023
Specificities of OBS data	Clock drift, orientation, LF noise and removal, possibility of redaction (hydrophones)	
Meaning of data quality codes	'Q' for clock corrected, 'M' for not clock corrected	'D' for not clock corrected
Channel names	Includes: - 'L' instrument code for geophones - *DH for DPG - 'X' for modified/filtered,	- Geophone + ampli generally 'H' source code - *DG for DPG - ??? for modified/filtered
List of OBS-specific processing software		*Provide link to specific site*

OBS-specific Software

2016	2023
Clock drift confirmation	Several codes available, most using noise cross-correlation. EQ time residual also possible.
Noise removal	ATACR, tiskitpy, ISP…
Sensor orientation calculation	Several codes, need to quantify…
Common pipeline for data preparation (from ”raw” miniSEED to time-corrected)	Nothing specified, many loggers output “corrected” data, need to make sure they specify their corrrection
Active seismic data extractor	Nothing written but should be easy using obspy…

Proposed action

- Proposal:
  - **User, meta/data preparer references**: Make versionable (“issueable”) guides on a public site (FDSN-hosted?)
  - **FDSN requests**: Put on miniseed and stationxml reference/issue pages (J Quinteros)
  - **Software**: Make (or expand existing) website with list of validated and unvalidated software
    - Validated:
      - Full, relatively simple installation instructions
      - Examples using online data/metadata
      - Applied to a reference dataset, standardized output provided
- Task force
  - Define reference datasets and standardized outputs
  - Decide how to organize/publish
  - Who?
    - Interested WGV members
    - People involved with public domain OBS software: Helen Janiszewski & Pascal Audet (ATACR), John Collins (OBSIP), Non-N Americans!