AlpArray 2016 & 2017: data quality analysis based on surface waves

Florian Fuchs | Gidera Gröschl | Petr Kolinsky | Götz Bokelmann | AlpArray Working Group
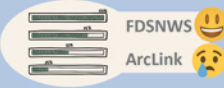
Explanation

For **surface wave analysis**, we are interested in **two-hour time windows** for each earthquake. For different reasons we cannot use the data of all stations for the data processing. These are: the **record is not available** for the given day, **components are missing**, there are **too many gaps or overlaps**, the **traces are shifted in time**, the records are **too noisy** or have **no seismic signal**.

We selected **32 earthquakes** spanning 2016 and 2017 and investigate the quality of the data before the surface wave analysis. This poster summarizes information about availability and quality of the data for **918 stations** and the respective time window for each earthquake.

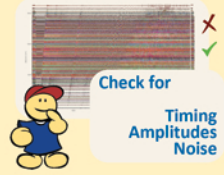**1** Download the data — 2h segments for each earthquake — FDSNWS / ArcLink — ~ 15 % not available

2 Check for Length, Gaps, Overlaps, Traces, Components — ~ 10 % data rejected

3 Plot all stations — Check for Timing, Amplitudes, Noise — ~ 10 % data rejected
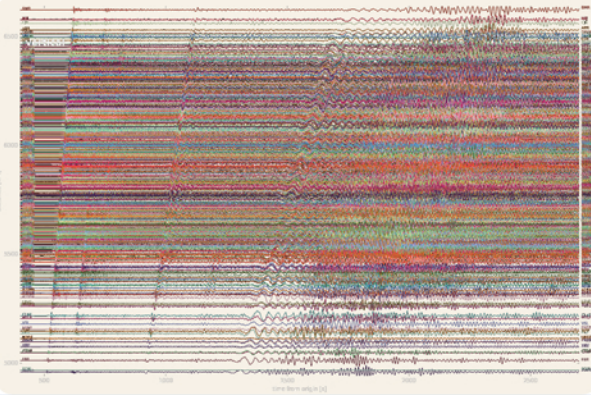
4 in total **20 %** of data rejected due to bad quality

M7.1 North of Ascension Islands, 2016-08-29 (random example)

Summary

	20160124	20160125	20160130	20160302	20160315	20160417	20160518	20160729	20160819	20160829	20161015	20161030	20161113	20161121	20161125	20161208	20161225	20170110	20170122	20170403	20170503	20170510	20170529	20170602	20170612	20170614	20170717	20170813	20170908	20170910	20171010	20171112
number of installed stations	795	795	800	808	811	822	824	850	852	857	868	873	876	879	880	887	886	887	894	899	903	902	905	904	908	908	907	907	906	905	907	906
... with available data	656	659	665	690	702	719	720	745	739	748	753	782	773	773	776	780	774	768	760	786	791	771	791	783	787	804	797	786	794	786	788	745
... without data	139	136	135	118	109	104	104	105	113	109	115	91	103	103	103	100	113	118	127	108	108	128	112	119	118	100	111	122	113	121	118	160
... with good data	546	582	566	574	630	582	634	612	619	655	641	669	647	665	662	653	679	662	649	697	700	551	634	710	719	665	527	695	679	680	688	631
with merged gaps	42	9	20	30	7	36	15	28	30	22	13	8	39	45	41	57	35	24	40	26	29	116	34	18	15	46	122	23	34	25	28	35
... with merged overlaps	1	0	1	2	0	3	2	4	2	1	2	1	1	1	1	3	2	1	0	2	47	33	0	1	5	88	2	3	2	1	2	1
... with too long gaps	29	29	30	52	35	42	46	50	57	36	70	78	57	37	28	39	41	46	36	36	35	43	65	24	27	53	35	30	37	31	21	45
... with too many traces	25	21	25	21	11	47	16	30	16	13	9	10	8	6	5	11	3	6	4	3	3	5	2	3	1	5	5	5	4	11	0	8
... with too short records	0	2	1	4	1	1	3	4	3	1	1	2	2	1	4	3	1	5	2	3	1	5	5	5	4	11	0	1			1	1
... with missing component	11	14	15	5	16	6	7	19	10	17	13	10	15	14	31	11	10	19	18	14	14	16	4	10	16	12	14	14	17	11	17	36	14
stations with available data in % with respect to installed stations	82,5	82,9	83,1	85,4	86,6	87,4	87,4	87,6	86,7	87,3	86,8	89,6	88,2	88,2	88,3	88,6	87,3	86,7	85,7	87,9	88,0	85,8	87,6	86,8	87,0	88,9	87,8	86,6	87,5	86,7	87,0	82,3
stations with useable (green) data in % with respect to stations with available data	89,8	89,7	88,3	87,8	90,7	86,4	90,4	85,9	88,1	90,6	87,1	86,7	88,9	92,0	90,7	91,3	92,4	89,5	90,7	92,0	92,4	92,6	88,6	93,0	93,3	89,1	92,5	91,6	90,2	89,8	91,1	89,7

Results (sorted by network code)

Legend

useable records:
- **ꞏ** ... 1 trace for each component (no gaps, no overlaps)
- **Gm** ... < 20 traces/comp., max. length of the merged gaps: 3 sec.
- **Om** ... < 20 traces/comp., merged overlaps

dismissed records:
- **#T** ... > 20 traces/comp.
- **lG** ... gaps longer than 3 sec.
- **mC** ... missing component
- **sR** ... record shorter than required time window (1,5 – 2,0 hr)
- **nD** ... no data available
- (black) ... station not installed

used in subarray [times] (stations):
- [01–04] (83)
- [05–08] (82)
- [09–12] (97)
- [13–16] (178)
- [17–20] (301)
- total subarr (741)
- neighbors (35)
- singles (77)
- total used (853)
- not used (37)
- total all (990)