"Data Paper" of JAMSTEC Report of Research and Development

Daisuke Suetsugu

Chief editor of JAMSTEC-R,

Japan Agency of Marine Earth Science and Technology

Introduction of Japan Agency of Marine Earth Science and Technology (JAMSTEC）

- Research Institute that covers
  - Oceanography and meteorology
  - Solid Earth Science
  - Life Science
  - Technology development
  - research vessels, submersible

- Personnel: 1,008

（554 for research and development）

- Budget: 32 billion JPY

Various data acquired by JAMSTEC

● Ocean & atmosphere

Temperature, salinity, CO2, current, cloud, aerosol, …

● Solid earth

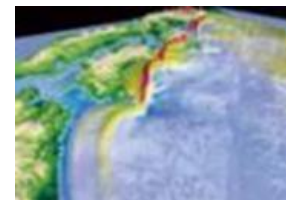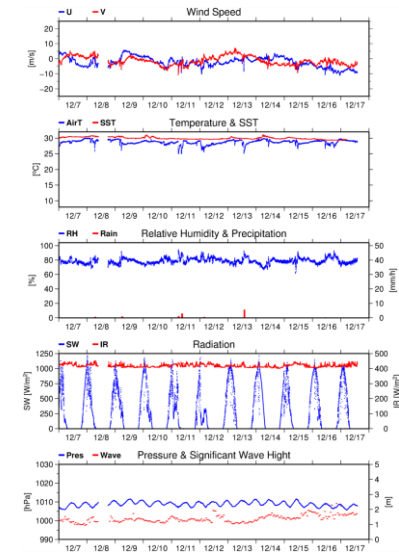Seismic waves, electro-magnetic data, underground structure, rock and sediment on seafloor and in drilled core,…

● Biology

生物サンプル、プランクトン、生物画像、等々

● Computer simulation

Climate, earthquake & tsunami, ocean current, …

● 2nd -order data made from 1st order data (listed above)

Introduction of JAMSTEC-R

- JAMSTEC publishes the peer-reviewed journal "JAMSTEC-R" (JAMSTEC Report of Research and Development) biannually (Sep/Mar) that reports research and development results on marine-earth science and technology. Its electronic journal is also available on J-STAGE.

- Those who are involved in research and technology development at Japan Agency for Marine-Earth Science and Technology, and those who conduct a survey or research activity using JAMSTEC's survey equipment, research facilities or data and samples etc., are all eligible for paper submission regardless of organization to which they belong.

- "Original Paper", "Review", "Report" and "Data Paper"
- All manuscripts have been peer-reviewed
- Extensive coverage of ocean and the earth related fields
- DOI granted
- Submissions can be either in English or in Japanese
- Article processing charge is free
- 10-12 papers published each year

Introduction of "Data paper" category on JAMSTE-R in 2017

- Promotion of Open Data

To promote to open data buried in JAMSTEC by providing data creators/observers with incentives. Data papers are also useful to advertise already-opened data to public.

Data paper of JAMSTEC-R

- The data paper is defined as a paper that describes data contents, acquisition methods, data formats, and access for data obtained by observations, experiments, measurements, or computer simulation. A data paper does not include analysis, interpretation, or scientific conclusions.

- JAMSTEC-R will publish data papers on data obtained by JAMSTEC members working for scientific research and technical development, or data obtained by observation/research facilities of JAMSTEC.

- Upon publication, the data are accessible via the JAMSTEC-R data repository.

Process to make "Data paper" category in JAMSTEC-R

● 2015

Discussion on WHAT DATA PAPER is.

Collect existing data papers, seminar with speacialists on the data paper, and so forth.

● 2016

Simulation of writing, reviewing, and editing a data paper.

Ask researchers to write a data paper on the basis of data that they published recently. The JAMSTEC-R committee conducted an review and edit on a trial basis and established a manuscript format, a submission rule, and review policy.

● April, 2017   Started to call for data paper.

Composition of Data paper in JAMSTEC-R

(1) Title

(2) Authors: Including persons who are directly engaged in data acquisition

(3) Abstract: Approx. 400 characters in Japanese or 250 words in English

(4) Introduction: Background, purpose, etc.

(5) Methods: Methods of experiments / surveys and observations, process of experiments /surveys and observations, data processing methods, locations of data acquisition, data quality control methods, etc.

(6) Expected use of the data: Value in reuse of the data that authors expect

(7) Data records: Data format, Accessibility, usage notes for reuse of the data (copyrights, usage conditions, etc.)

(8) Ownership of Data
In addition to above, figures, tables, acknowledgements, references, etc. should be included as necessary.

Example of a data paper

—Data Paper—

Seismic travel time

A database of global seismic travel times

JAMSTEC-R committee member

Junko Yoshimitsu[1*] and Masayuki Obayashi[1]

The authors belong to my research group

We have constructed a seismic travel time database as an aid to research on the interior structure of the Earth. We measured various types of travel times from seismic waveform data collected by stations around the world, including broadband ocean bottom seismometers (BBOBSs). We measured absolute arrival times of various seismic phases by manual picking of the phase onset, differential travel times of P waves between two stations, and differential travel times between PP and P waves. The differential travel times were measured using waveform cross-correlation method. So far, we have measured more than 80,000 travel times. These data have been used to improve the spatial resolution of our tomography model, particularly in regions of poor seismic ray path coverage such as the Pacific Ocean. The database is continuing to develop and is publically available at our own web site; we welcome anyone to use the data for further research.

Complete data set is available via site :
http://www.godac.jamstec.go.jp/catalog/jamstec-r_repository/metadataDisp/JAMSTEC-R_24DP01?lang=en

Keywords :
seismic tomography, seismic travel time, seismic observation network, manual picking, waveform cross-correlation, broadband ocean bottom seismometer (BBOBS)

http://doi.org/10.5918/jamstecr.24.23

Seismic travel time = propagation time of seismic wave from earthquake to seismic observatory. It bears information of temperature and mineral composition in the Earth.
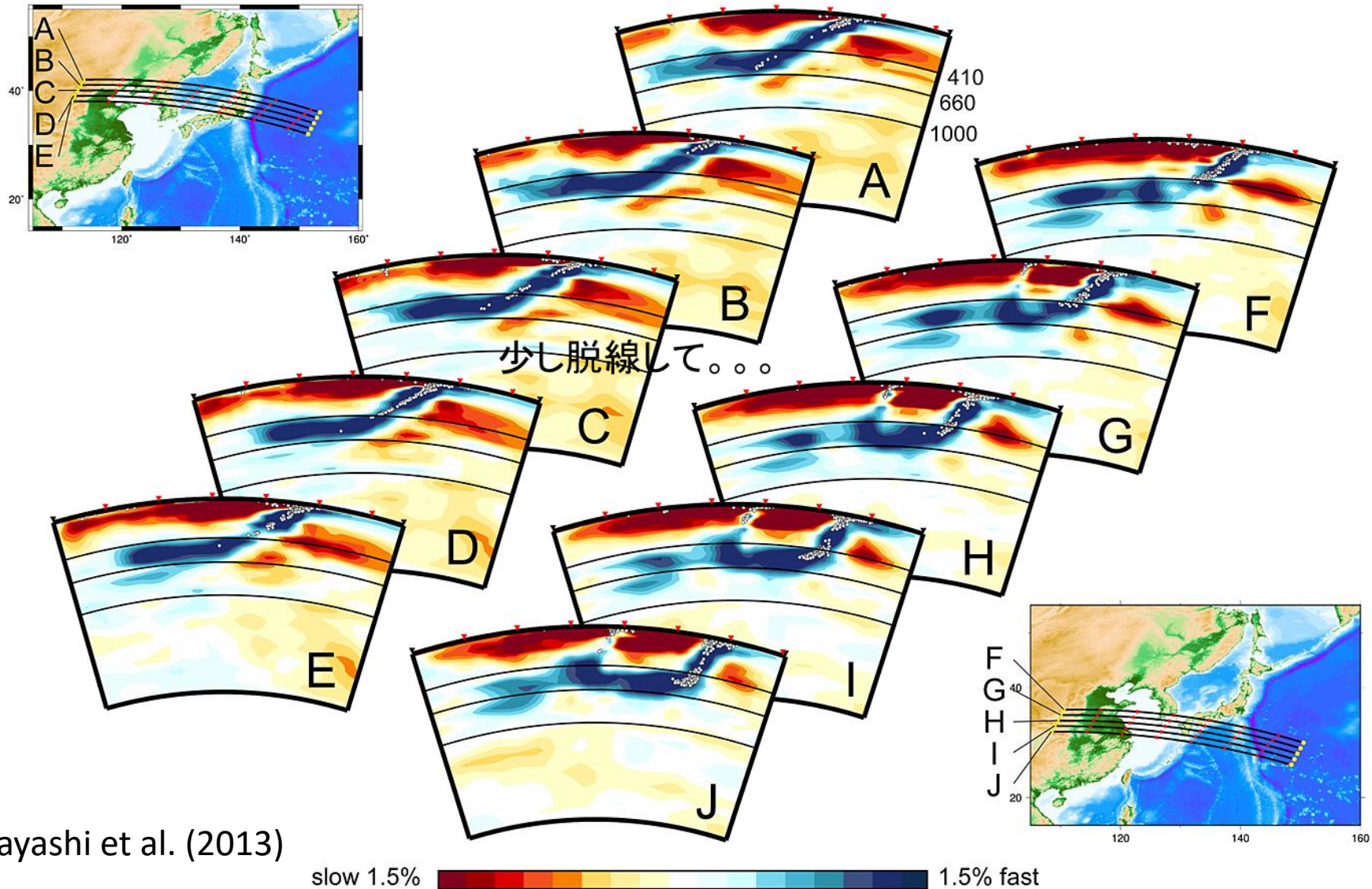**Massive travel time data are used for imaging seismic velocities in the Earth (seismic tomography)**

Seismic velocity anomaly

observatory

earthquakes

Travel time anomaly
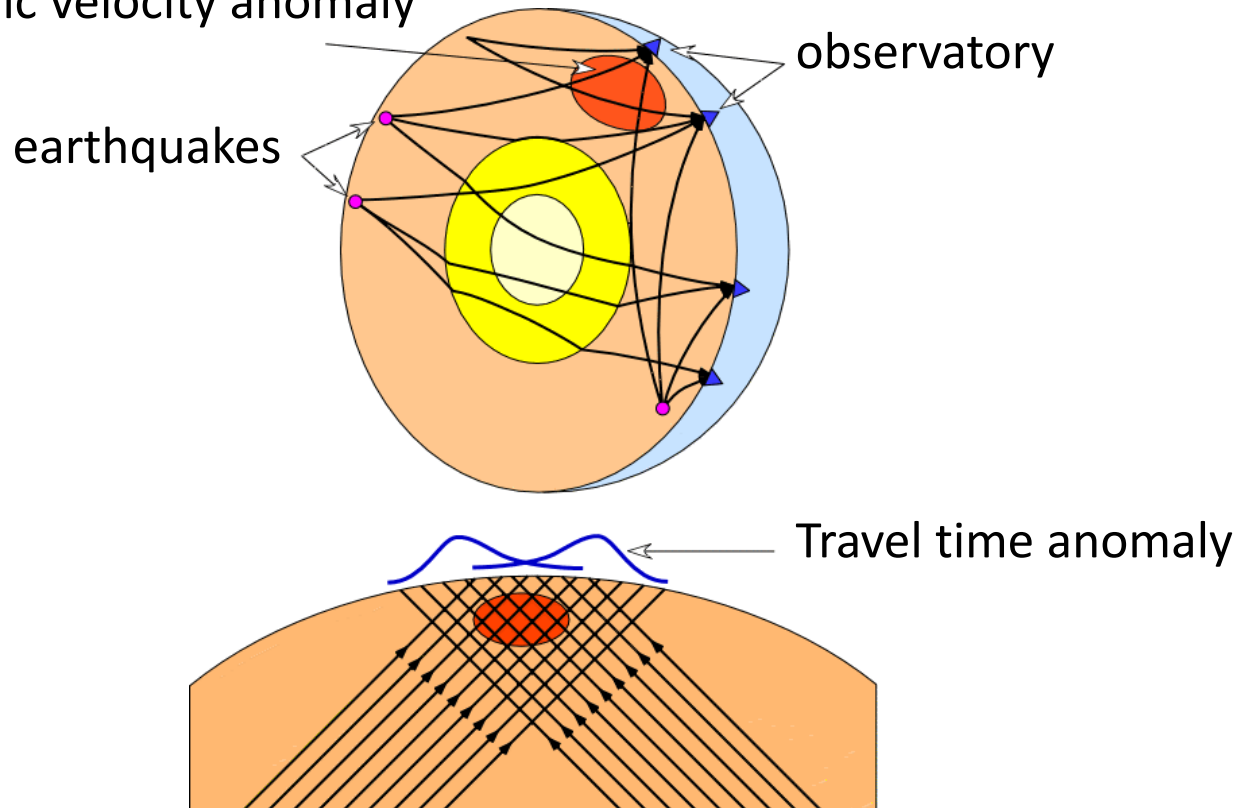
What can we get from seismic travel time data
Mantle structure beneath Japan

少し脱線して。。。

Obayashi et al. (2013)

slow 1.5% ▬▬▬▬▬▬▬▬▬▬ 1.5% fast

Example of data paper

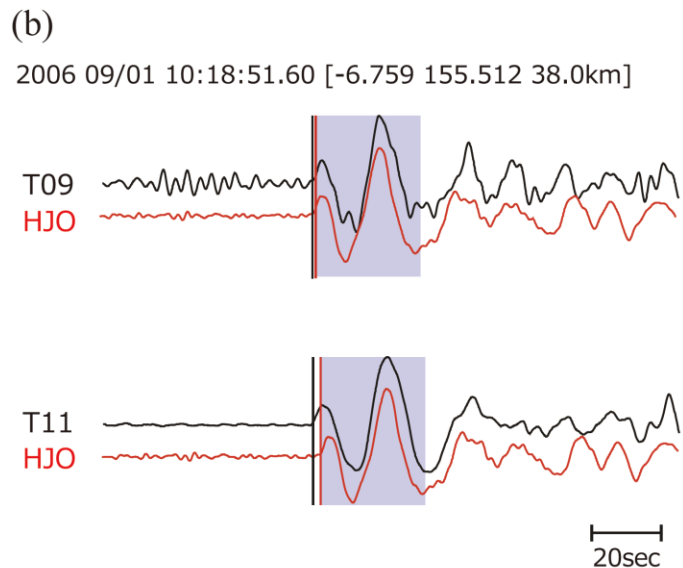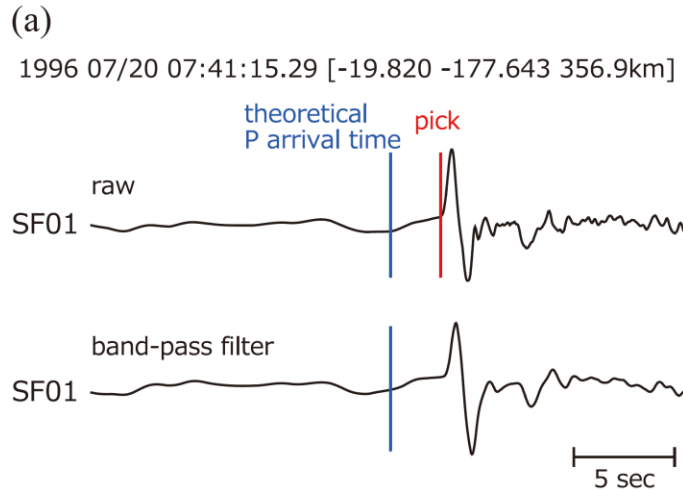# Distribution of seismic observatories
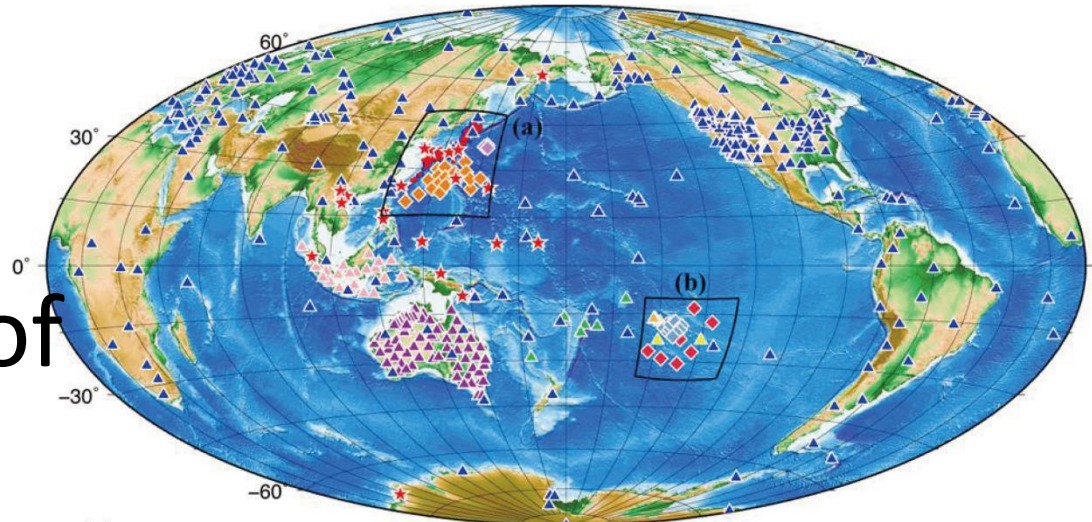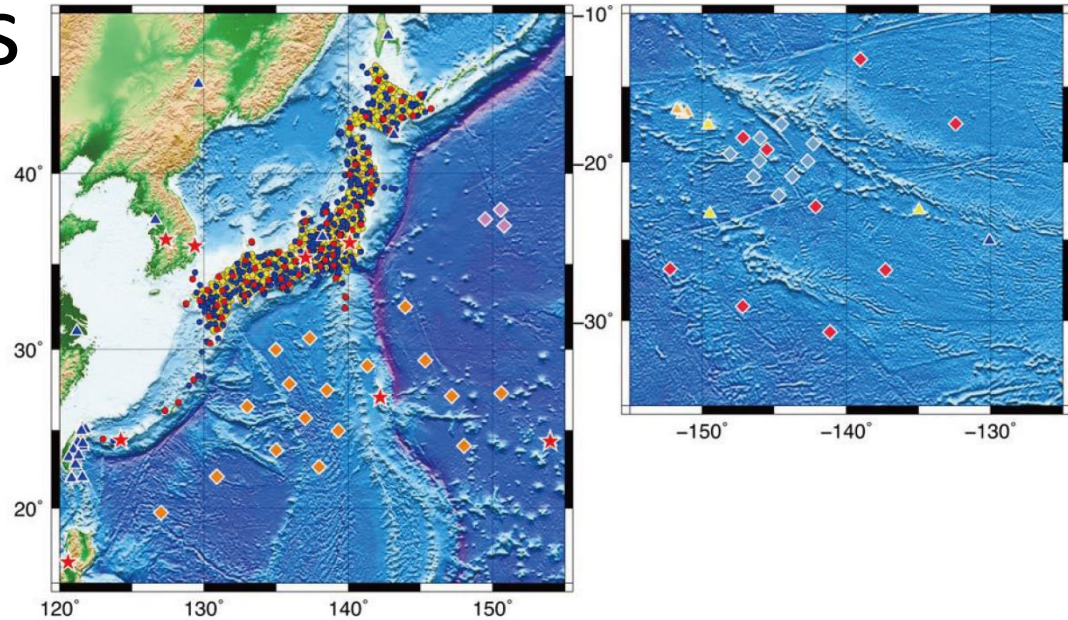
Fig. 1. Distribution of the seismic stations. Triangles, diamonds, dots, and stars are seismic stations used in this work. Colors and shapes represent different network as follows,
▲: SKIPPY; ▲: LDG; ▲: SPANET; ▲: JISNET; ★: OHP; ●: Hi-net; ●: F-net; ●: J-array; ▲: GEOFON; ▲: IRIS; ◆: Stagnant Slab Project; ◆: Polynesia BBOBS array; ◆: TIARES; ◆: Petit Spot network.

Example of data paper

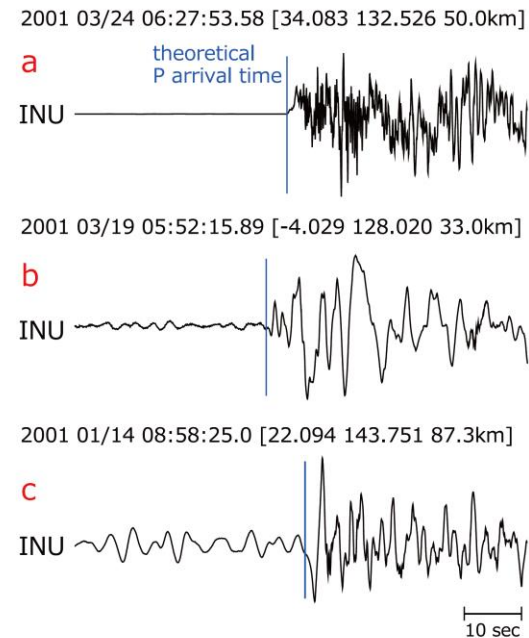- ## Measurement methods

- ## Quality of measured data

(a)

1996 07/20 07:41:15.29 [-19.820 -177.643 356.9km]

theoretical P arrival time   pick

raw
SF01

band-pass filter
SF01

5 sec

(b)

2006 09/01 10:18:51.60 [-6.759 155.512 38.0km]

T09
HJO

T11
HJO

20sec

2001 03/24 06:27:53.58 [34.083 132.526 50.0km]

a   theoretical P arrival time

INU

2001 03/19 05:52:15.89 [-4.029 128.020 33.0km]

b

INU

2001 01/14 08:58:25.0 [22.094 143.751 87.3km]

c

INU

10 sec

Fig. 3. Examples of seismic record with the quality a, b, and c determined by visual inspection of the onset clarity of P-wave.

Example of data paper

Data format

(a) Example of absolute arrival times in our database.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
19930416.140838 93	−17.778	−178.864	565.1	PS	OGS		27.057	142.203	20	bhz	P	14 17 41.893	−9999.999	−9.99	B	−	−9.99	− 9.99
19930416.140838 93	−17.778	−178.864	565.1	PS	PSI		2.694	98.924	987	bhz	P	14 20 7.256	−9999.999	−9.99	A	−	−9.99	− 9.99
19930416.140838 93	−17.778	−178.864	565.1	PS	TSK		36.21	140.11	350	bhz	P	14 18 32.625	−9999.999	−9.99	B	−	−9.99	− 9.99
19930603.093825 68	−14.841	167.299	151.8	SK	SA02		−17.364	144.485	465	bhz	P	9 43 10.248	−9999.999	−9.99	A	−	−9.99	− 9.99
19930603.093825 68	−14.841	167.299	151.8	SK	SA03		−17.364	144.485	465	bhz	pP	9 43 38.432	−9999.999	−9.99	A	+	−9.99	− 9.99

(c) Example of differential travel time between PP and P (PP-P).

1	2	3	4	5	6	7	8	9	10	11	12	13	14
19920102 164040.80	48.731	129.221	10.0	5.6MB	AAK	II	42.639	74.494	1645.0	−0.940	204.5	B	PP-P
19920102 194146.40	5.670	−73.836	0.0	5.7MB	ALE	II	82.503	−62.350	60.0	0.040	176.45	B	PP-P
19920120 133704.80	27.929	139.471	521.3	5.8MB	KONO	IU	59.649	9.598	216.0	−0.570	200.25	B	PP-P
19920120 133704.80	27.929	139.471	521.3	5.8MB	PFO	AZ	33.612	−116.459	1259.0	−2.630	205.80	B	PP-P
19920120 133704.80	27.929	139.471	521.3	5.8MB	GRA1	GR	49.692	11.222	499.0	−0.530	224.90	C	PP-P

More than billion of data are accumulated in the seismic travel time data base.

Example of data paper

Accessibility

Readers can access data via data repository

Summary

- We introduced a new category "data paper" in JAMSTEC-R to promote "Open data." It should be useful to highlight contribution of data creators/observers to advance in science

- To establish format of data paper and editing and review process, we performed a simulation by making and editing a data paper on a trial basis with existing a data base in JAMSTEC.