



## Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation

### Report

#### Station Book Compilation

Activity:	<i>Networking accelerometric networks and SM data users</i>
Activity number:	<i>NA3, 3.2</i>
Deliverable:	<i>Station Book Compilation</i>
Deliverable number:	<i>D3.5</i>
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## Summary

A new Station Book for European broad-band and strong motion seismic stations is designed and hosted at ORFEUS Data Centre. Up-to-date instrumental metadata is guaranteed by daily synchronisation with EIDA. Additional, station and site specific information can be added or edited by network operators via a unique web interface.

## Description

Compilation of a comprehensive Station Inventory (or Station Book) for seismic stations (both broad-band and accelerometric stations) has a long history of different initiatives both on a global scale (e.g. FDSN) and in Europe (e.g. ORFEUS WG1, NERIES), all with the common challenge to maintain the inventories with up-to-date information (e.g. organization information, instrumental response and site characteristics). Within task 3.2 a framework has been developed and implemented to host and maintain an international, comprehensive Station Book for European broad-band and strong motion seismic stations to provide relevant information to both the earthquake and engineering communities. The information can range from basic details such as coordinates and site names to acquisition chain description, morphology of the site or velocity profiles.

The development and implementation has been done to enable review and completion of the inventory with limited maintenance, including

- (i) the definition of guidelines containing the specific formats and contents of the station information;
- (ii) the preparation of protocols to collect instrument and channel information;
- (iii) the development of an online interface to update and integrate new stations in the station metadata and station book;
- (iv) the definition and implementation of a synchronization protocol to ensure the coherence and the completeness between the station metadata and the instrument response database.

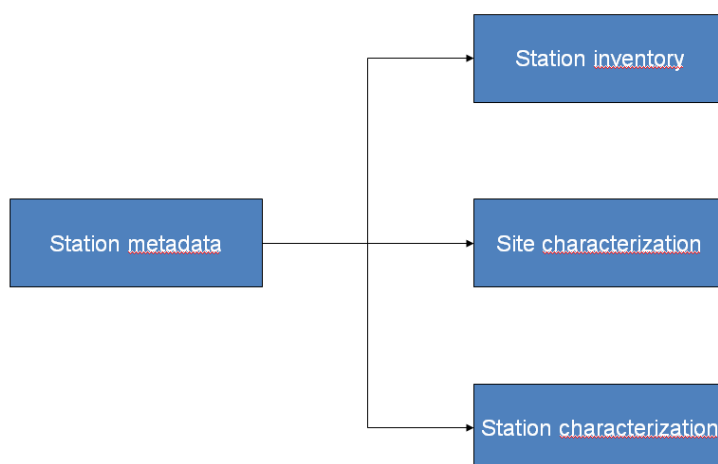


Fig. 1. Schematic overview of the information in the Station Book.

The design of the Station Book database, done by ETH, is based on the SeisComP3 database model (Station Inventory) with extensions for station and site characterization (Fig. 1). Instrumental response and basic station metadata are automatically retrieved from the European Integrated Data Archive (EIDA) to ensure automatic integration of new stations and up-to-date metadata information (which is the responsibility of the network operator to provide this to the EIDA node hosting the waveform data). The

Station Book interface, developed by KNMI, enables network operators to insert specific station and site characteristics. Thus, the Station Book information is gathered from two different sources:

- **Common network and station metadata:** collected automatically from EIDA through daily synchronization.
- **Station and site characterisation:** edited by network operators (requires password).

<i>Collected from EIDA</i>	<i>Added/edited by network operators</i>
<b>Network</b>	<b>Network</b>
Network code	Owner(s)
Effective time window	<b>Station</b>
Region, Institutions, Archive and Description	Owner(s)
Type, Class, Restriction	Pictures
<b>Station</b>	Geological unit
Station code	Morphology
Location code	Ground type EC8
Effective time window	Vs 30
Name, Affiliation, Country and Description	$f_0$ and Amp( $f_0$ )
Class, restriction	Basing flag
<b>Sensor location</b>	Groundwater depth
Code	Bedrock depth
Location	Borehole depth and bedrock depth
Effective time window	Geology of borehole layers
<b>Stream</b>	<b>Sensor location</b>
Code	Housing details
Effective time window	Building details
Instrumentation history	

The Station Book interface is designed at, and hosted by, ORFEUS Data Centre and enables users to search for and view station and detailed site information in the database. The interface also enables network operators to add/edit the station and site characteristics.

### Reference list

**ORFEUS Working Group 1:** <http://www.orfeus-eu.org/workinggroups/wg1.html>

**Station Book:** <http://www.orfeus-eu.org/stationbook>

**SeisComp3 software:** <http://www.seiscomp3.org/>

**NERIES:** <http://www.neries-eu.org>

**EIDA:** <http://www.orfeus-eu.org/eida>

**KNMI:** <http://www.knmi.nl>

**ETH:** <http://www.seismo.ethz.ch/index>

Database models:

**SC3:** [http://geofon.gfz-potsdam.de/\\_uml/](http://geofon.gfz-potsdam.de/_uml/)

**Station characterization extension:**

<http://145.23.252.222:8080/export/sites/default/stationbook/information/stationCharacterization.pdf>

**Site characterization extension:**

<http://145.23.252.222:8080/export/sites/default/stationbook/information/siteCharacterization.pdf>

**Links to concrete results**

The Station Book database is hosted at ORFEUS data Centre (<http://www.orfeus-eu.org>) and can be accessed by the URL: <http://www.orfeus-eu.org/stationbook>

The screenshot displays the 'Station Book' web interface. At the top, there are navigation links for 'RRSM Interface' and 'About Station Book'. The main header reads 'Station Book Orfeus Data Center' with the 'NERA' logo. Below the header, there are four main navigation buttons: 'Home', 'Search Stations', 'Select by Network', and 'Manage Network(s)'. The page content shows 'Station Book Home' and 'European Station Book' with a sub-option 'All stations by time frame'. The central feature is a world map with numerous station locations marked by green triangles (open) and orange triangles (closed). The map includes a search bar, zoom controls, and a legend for station types. The legend shows a green triangle for 'open' and an orange triangle for 'closed'. The map also displays various geographical labels and a scale bar.

Fig 1. Entry page of the Station Book web-interface enabling the user to search for networks and/or stations, view information and edit specific station and site characteristics.

## Station Detail

Select by Network	Description <small>EIDA data &amp; Ownership</small>		
Network RA	<b>Network</b> RA	<b>Latitude [°]</b> 46.611100 N	<b>Country</b> France
Station CABF	<b>Station Code</b> CABF	<b>Longitude [°]</b> 8.087500 E	<b>Station Name</b> Chapelle des Bois (39)
Description	<b>Affiliation</b> LDG - CEA,PARIS,FRANCE	<b>Elevation [m]</b> 1070	<b>Description</b> Chapelle des Bois (39),France
Station Details	<b>Shared / Restrict.</b> Yes / No	<b>Owner Name</b> -	<b>Owner Phone</b> -
Station Pictures	<b>Start</b> 2003	<b>Owner Department</b> -	<b>Owner Email</b> -
Housing & Building details	<b>End</b> -	<b>Owner Agency</b> -	<b>Owner Address</b> -
Instrumentation History	<b>Station Details</b> <small>Morphology, Ground type, Geology, etc.</small>		
Borehole	<b>Geological Unit</b> -	<b>Morphology Class</b> -	
		Classes: T1, T2, T3, T4; based on the <a href="#">Italian building code</a>	
	<b>Morphology Description</b> -	<b>Ground type</b> EC8 -	
		EC8 types: A,B,C,D,E,S1,S2; <a href="#">more info here</a>	
	<b>Groundwater Depth [m]</b> -	<b>Ampl(f<sub>0</sub>)</b> -	
	<b>Vs 30 [m/s]</b> -	H/V amplitude at f <sub>0</sub>	
	<b>f<sub>0</sub> [Hz]</b> -	<b>Basin Flag</b> -	
	Fundamental frequency at the site	<b>Bedrock Depth [m]</b> -	

### Metadata files EIDA

Dataless SEED
SC3 Inventory XML
FDSN Station XML

Fig2. Example page within the Station Book web-interface to display station metadata details.