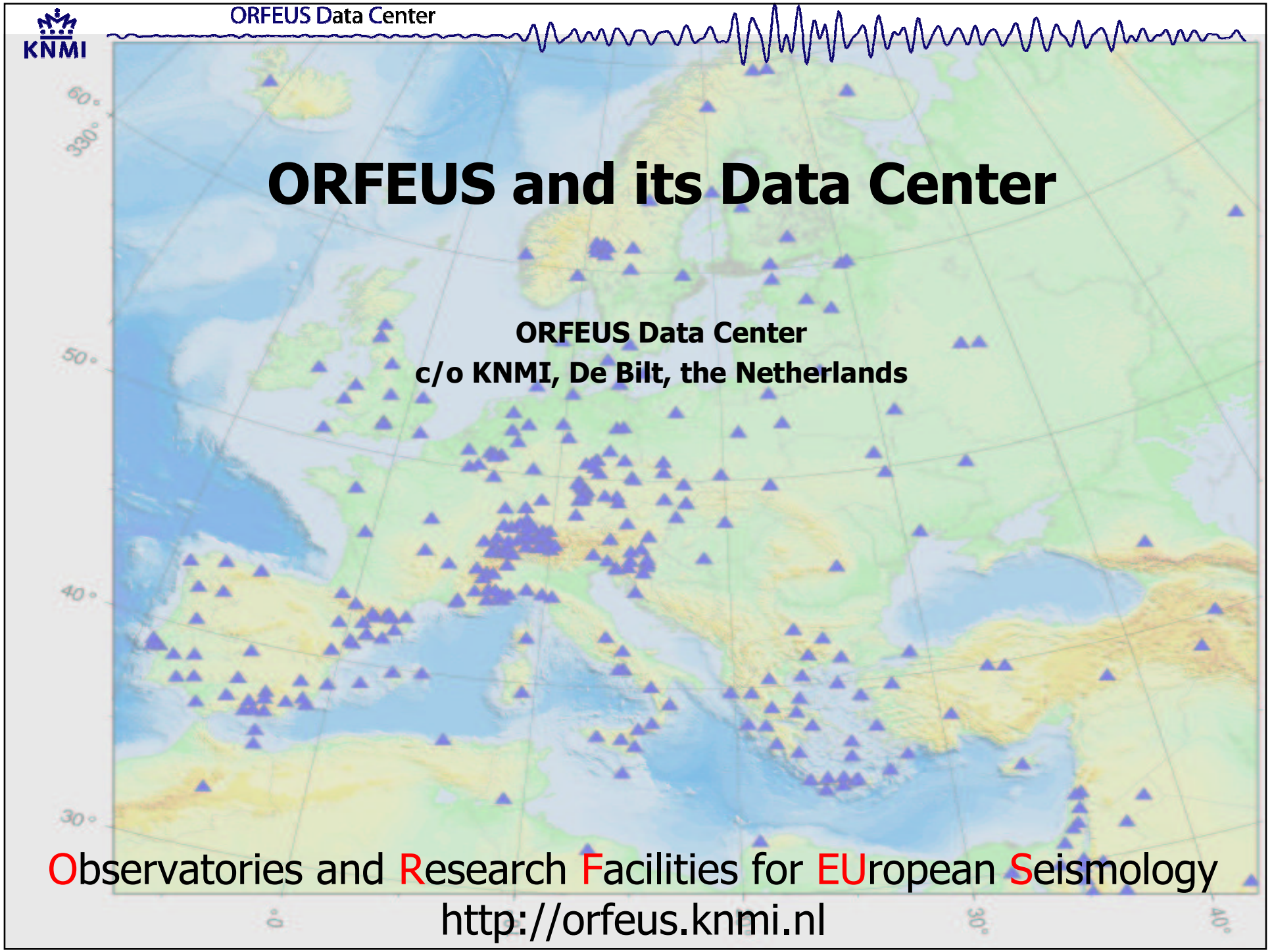


ORFEUS and its Data Center

ORFEUS Data Center

c/o KNMI, De Bilt, the Netherlands

Observatories and Research Facilities for EUropean Seismology

http://orfeus.knmi.nl

ORFEUS Organizations and Research Facilities for EUropean Seismology

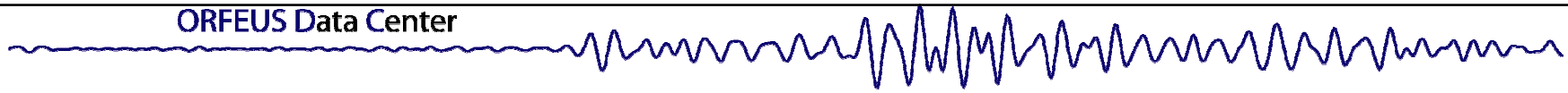
The European non-profit foundation that aims at co-ordination and promoting digital, broadband (BB) seismology in the European-Mediterranean area.

Orfeus Data Center (ODC)

Objective:
- European earthquake high quality waveform data archive

Policy:
- Open data (emphasis on research community and decision makers)

Requirements:
- Homogeneous format, complete description (SEED)
- Systematic archives (events and continuous)
- Easy and rapid data access/search



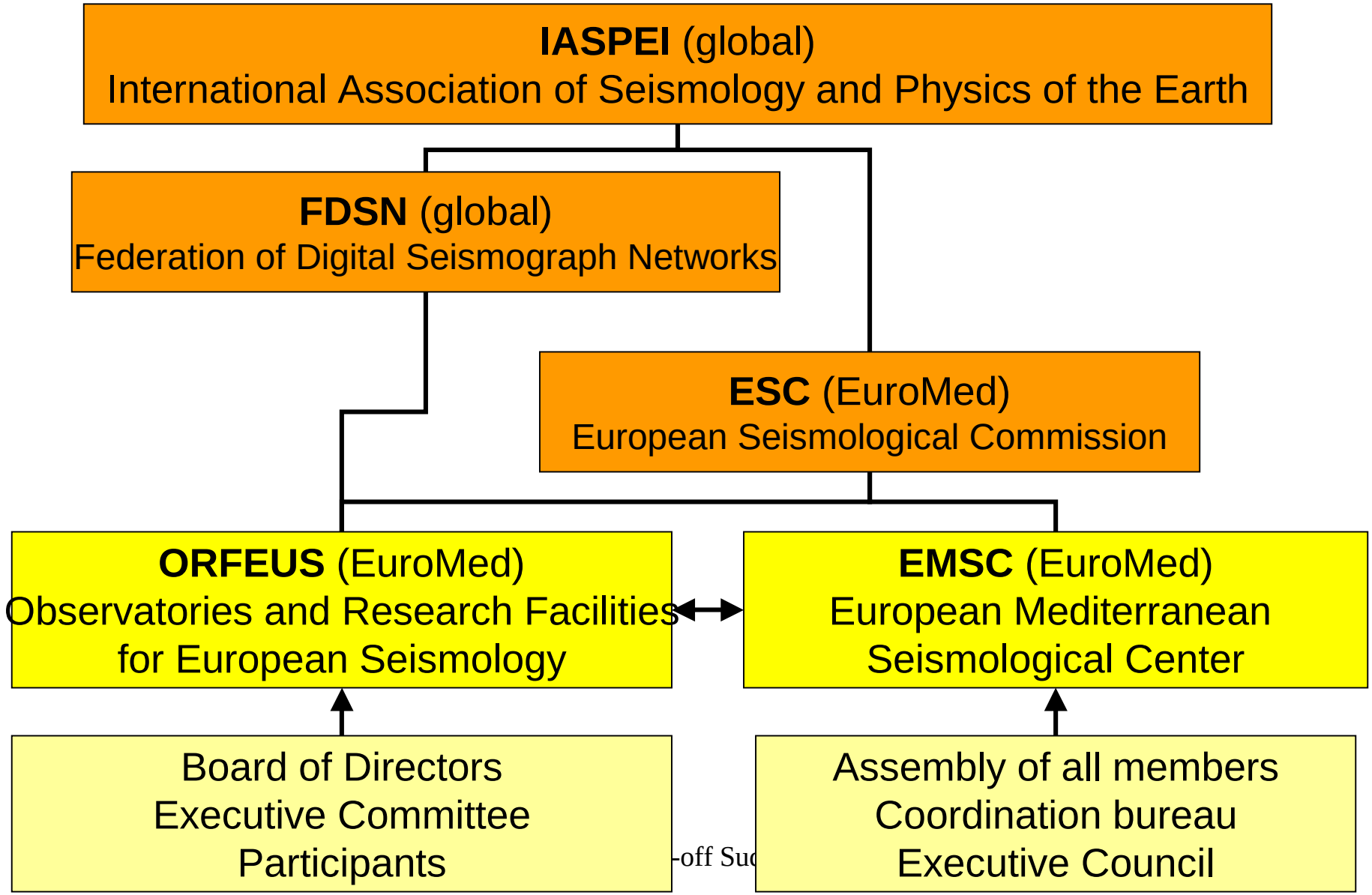
ORFEUS organisation

- ***Board of Directors***
  Representatives of Corporate funding agencies (President: D. Giardini)
- ***Executive Committee***
- ***ORFEUS/EMSC coordinating committee***
- ***Scientific Advisory Board***

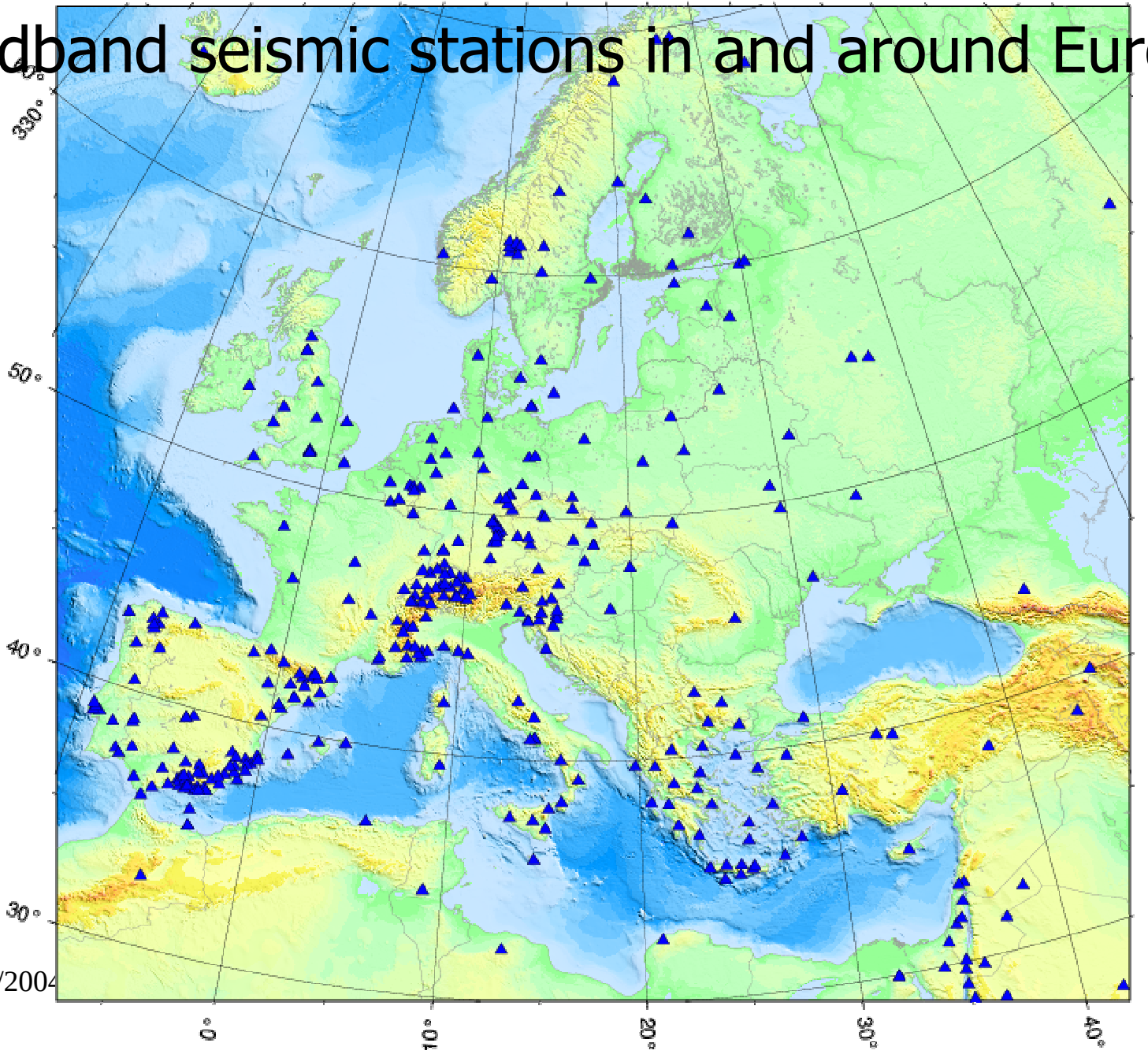
- ORFEUS Secretary General (T. van Eck)
- Director ORFEUS Data Centre (B. Dost)
- Board members: Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Spain, Switzerland, UK, (Sweden)

- KNMI (Royal Netherlands Meteorological Institute) is the host.
  - Provides office space, infrastructure, 1.5 f.t.e. staff for operations
- ORFEUS finances 2.1 f.t.e. personnel (including MEREDIAN)

Global and European collaboration in earthquake monitoring



Broadband seismic stations in and around Europe



E□ro□ean seis□olo□ical data

- □1□□Seismological Observatoria in Europe and its surroundings
- Data types:
  - Broadband (BB) □ ORFEUS (waveform data)
  - □ery □ong Period (□□P)
  - Short period (SP) □ EMSC (parameter data)
  - Ocean Bottom Seismometers (OBS) □ ORFEUS (waveform data)
  - Acceleration (ACC)
- (Semi)permanent BB stations in Europe and its surroundings
  - □ □□□BB stations installed
  - □25□additional BB stations in funding stage (5 years planning)
  - □□BB stations in □EBSN □ ODC target □□□(5 years planning)

ORFEUS □or□in□ □ro□□s

Coordination activities

- *Station siting (□G1)* (□. □ila)
  - Coordinating BB station siting in Europe and its immediate surroundings.
  - European BB station inventory.
- *Technical Support (□G2)* (D. Pesaresi)
  - Gather and disseminate technical information. Coordinate technical assistance on BB sensors and data-loggers.
- *Mobile stations (□G□)* (P. Denton)
  - Maintain inventory and coordinate data archiving and dissemination
- *Seismological software (□G□)* (Manfred Baer)
  - Maintain the Seismological Software □ibrary (Uni□, □inu□, PC and Mac) and software coordination.

ORFEUS workshops

EMICES project: ORFEUS workshops 2001, 2002 and 2003:

- Object Oriented software: September 22-26, 2003.
  Athens, Greece (ORFEUS/EMICES).
- Data exchange in the Mediterranean area:
  Nicosia, Cyprus (ORFEUS, EMSC/EMICES, USGS and UNESCO initiative)
  September 10-12, 2003.
- Instrumentation: November 18-22, 2002,
  Istanbul, Turkey (ORFEUS).
- Real-time data exchange: October 21-25, 2002.
  Barcelona, Spain (ORFEUS/EMICES).

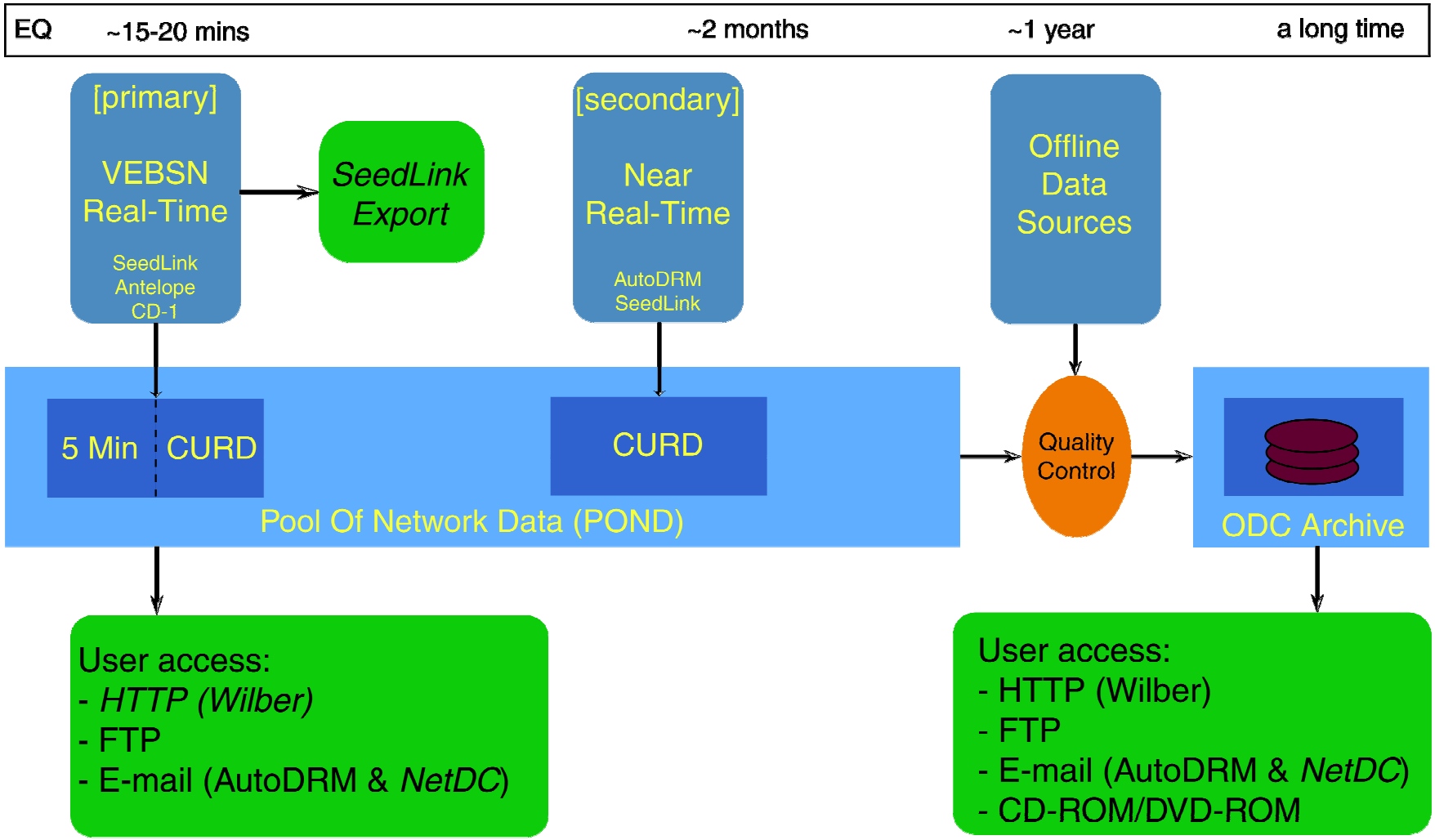
EMICES: European-Mediterranean Infrastructure Co-ordination for Earthquake Seismology. EC project EVK2-CT-2001-00122

Relevant examples of ORFEUS coordination in Europe

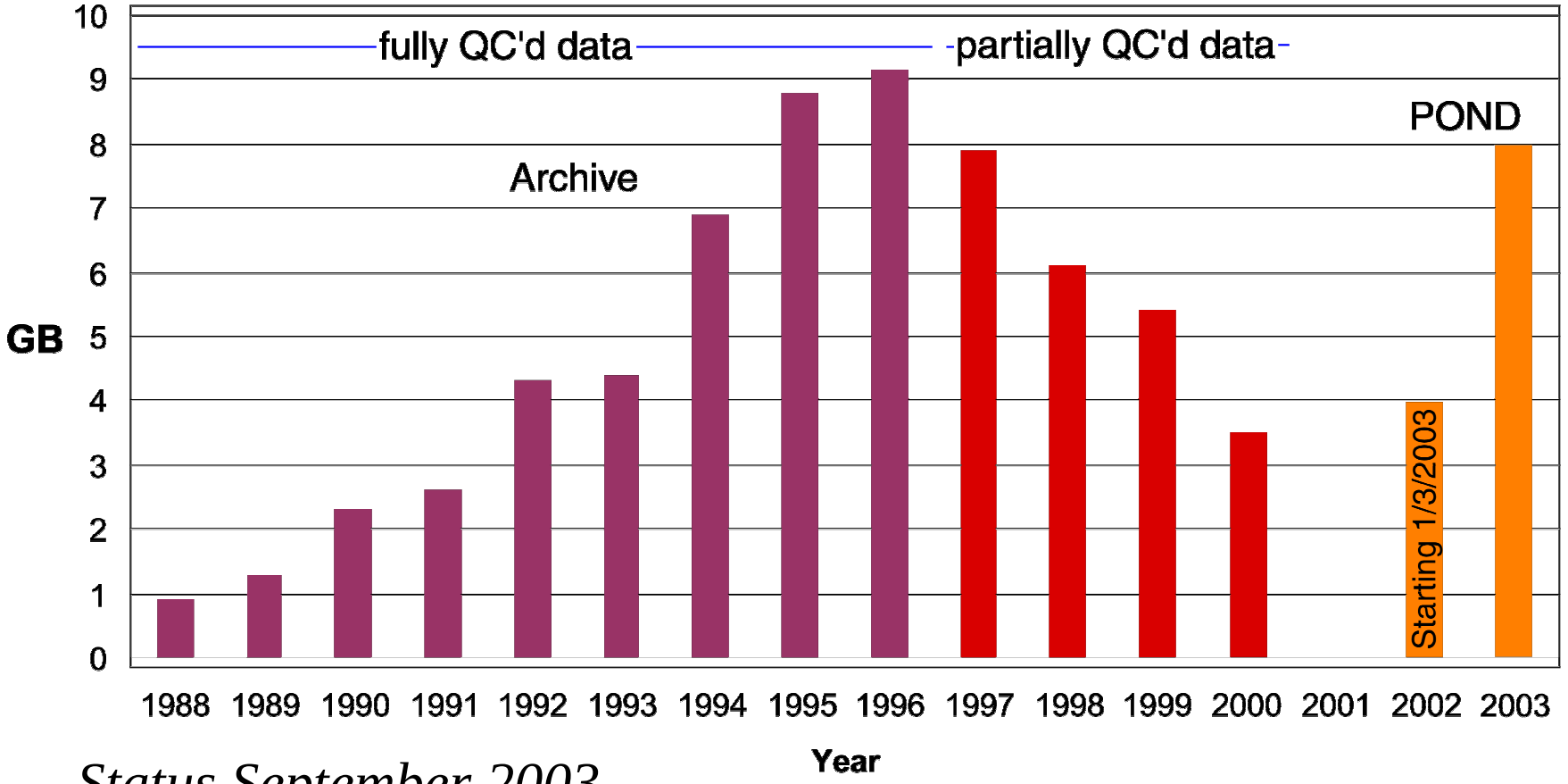
- full SEED format
  - Response functions → ground motion retrieval
  - no duplication of station codes (NEIC)
  - network codes (FDSN) → proper ownership reference

- Standardized waveform data exchange:
  - AutoDRM (ETH, email based) → Additional access to SP
  - Seedlink (GFZ/ORFEUS, real-time)
    → European and regional networks possible

ODC □i□eline


EQ
~15-20 mins
~2 months
~1 year
a long time
[primary]
VEBSN
Real-Time
SeedLink
Antelope
CD-1
SeedLink
Export
[secondary]
Near
Real-Time
AutoDRM
SeedLink
Offline
Data
Sources
5 Min
CURD
CURD
Pool Of Network Data (POND)
Quality
Control
ODC Archive
User access:
- HTTP (Wilber)
- FTP
- E-mail (AutoDRM & NetDC)
User access:
- HTTP (Wilber)
- FTP
- E-mail (AutoDRM & NetDC)
- CD-ROM/DVD-ROM

ODC Event Data holdings



Status September 2003

MEREDIAN EC Project

Mediterranean European Rapid Earthquake Data Information and Archive Network ***EC contract ERC-CT-2004-006315***

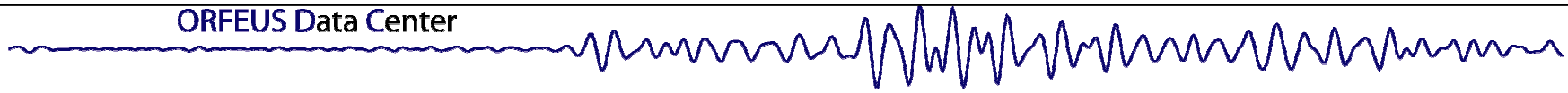
Start date: November 1, 2004

MEREDIAN consortium: 18 participants (national observatories)

End date: April 30, 2005

Goal: Initialize real-time waveform data exchange in Europe and make previously inaccessible data available to the research community, developing a distributed archive

- JRA1: Improving and securing data archival
- JRA2: Improving rapid cross border data exchange
- JRA3: Developing a distributed European seismological archive
- JRA4: Seismological software co-ordination



MEREDIAN CONSORTIUM (participants)

Royal Netherlands Meteorological Institute (KNMI) coordinator	NL
Instituto Geográfico Nacional (IGN)	ES
Istituto Nazionale di Geofisica e Vulcanologia (INGV)	IT
National Observatory of Athens / Institute of Geodynamics (NOA/IG)	GR
GeoForschungsZentrum Potsdam (GFZ)	DE
Centre National de la Recherche Scientifique (CNRS)	FR
Zentralanstalt für Meteorologie und Geodynamik (ZAMG)	AT
Eidgenössische Technische Hochschule Zürich (ETH)	CH
Norwegian Seismic Array (NORSAR)	NO
Environmental Agency Republic Slovenia (EARS)	SI
Geophysical Institute Academy of Sciences Czech Republic (IG ASCR)	CZ
Geophysical Institute Slovak Academy of Sciences (GIS SAS)	SK
National Institute of Research and Development for Earth Physics (NIEP)	RO
Geophysical Institute Bulgarian Academy of Sciences (GI BAS)	BG
Institute of Geophysics Polish Academy of Sciences (IG PAS)	PL
University of Malta (UOM)	MT
Geological Survey of Estonia (GSE)	EE
Geodetical Geophysical Research Institute Hungarian Academy of Sciences (GGRI MTA)	HU

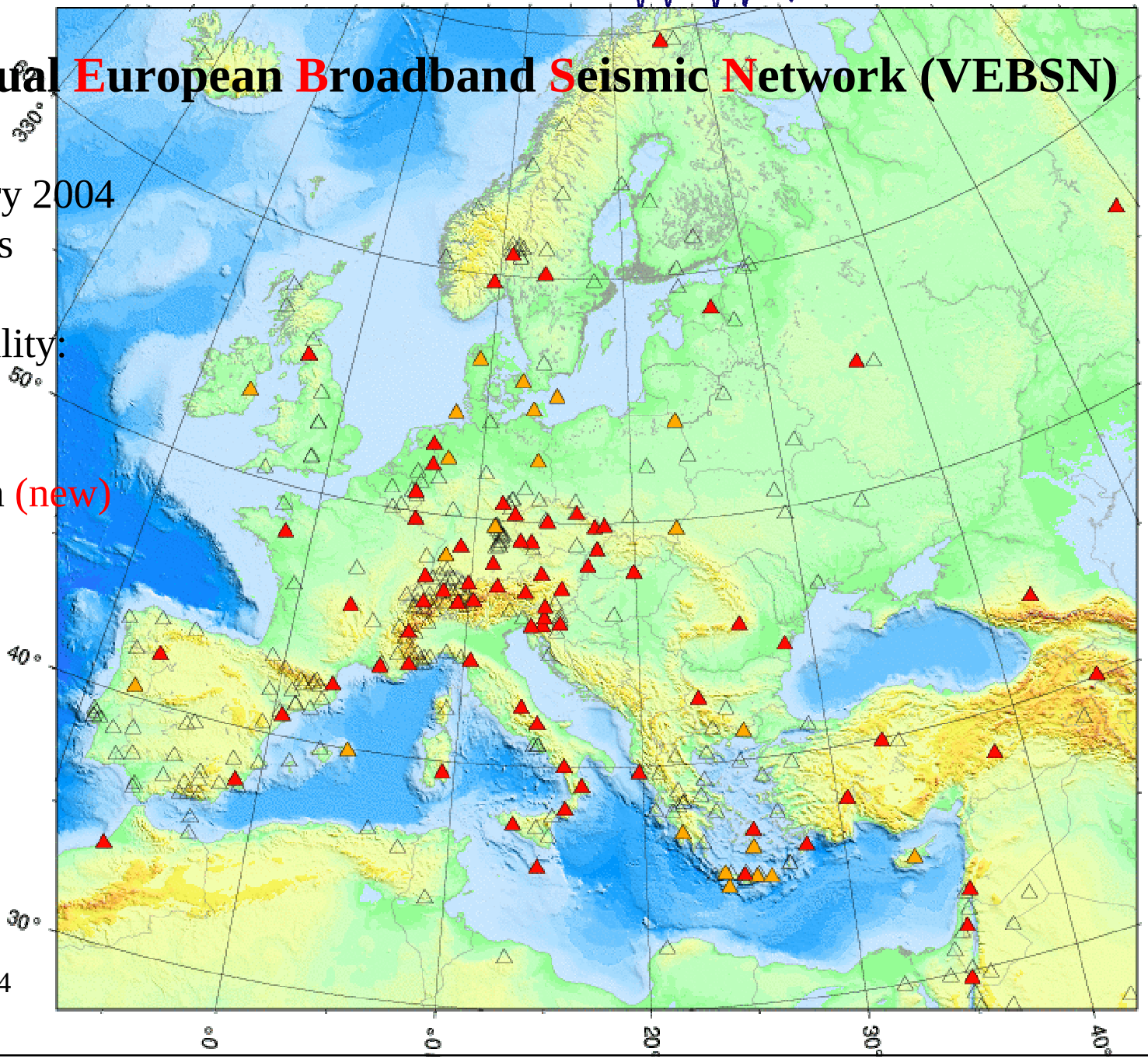
KNMI

ORFEUS Data Center

Virtual European Broadband Seismic Network (VEBSN)

Status January 2004
~ 100 stations

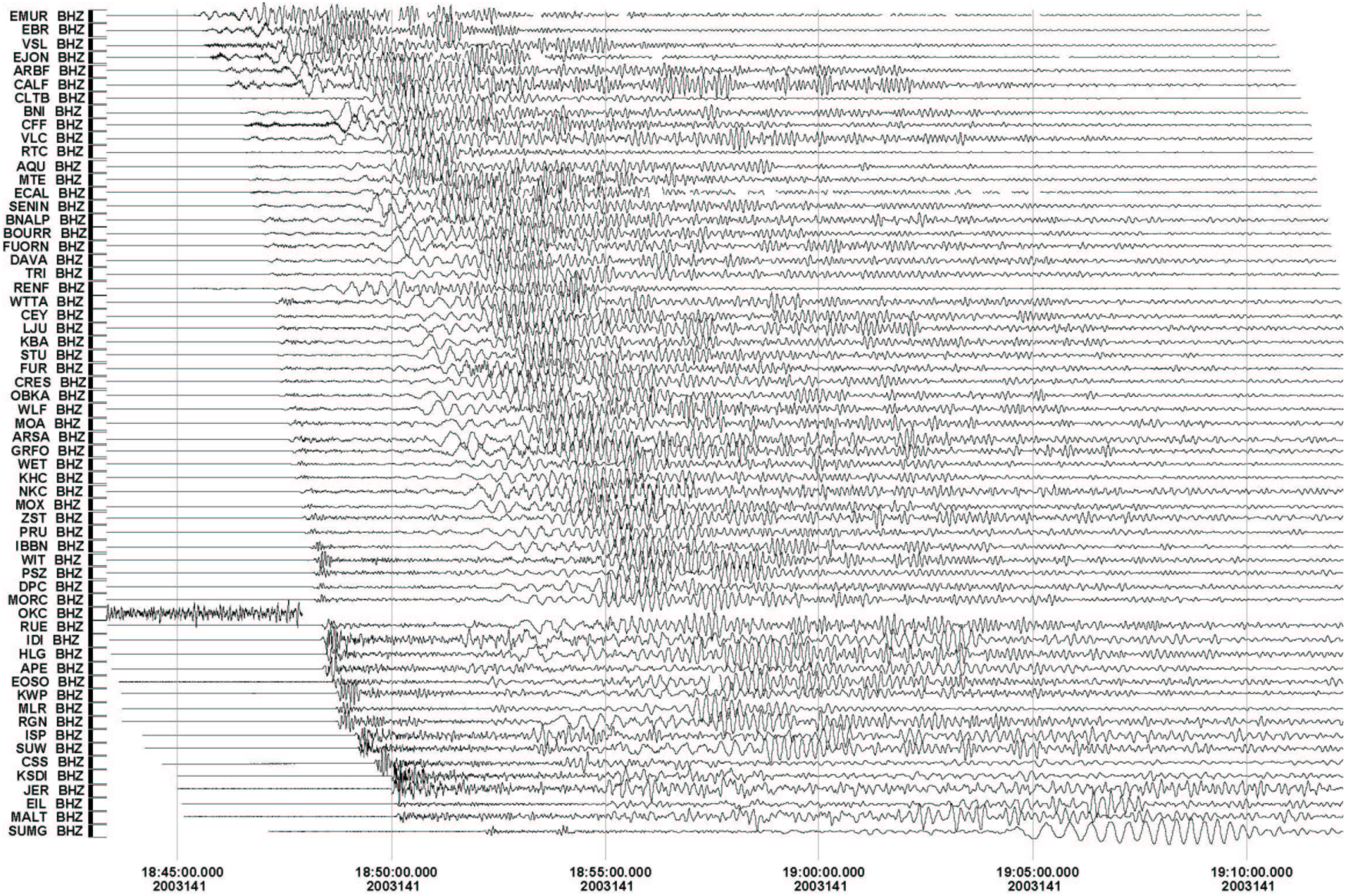
Data availability:
- Continuous
- Event data
- Data stream (new)



2/24/2004

KNMI

ORFEUS Data Center



2/24/2004

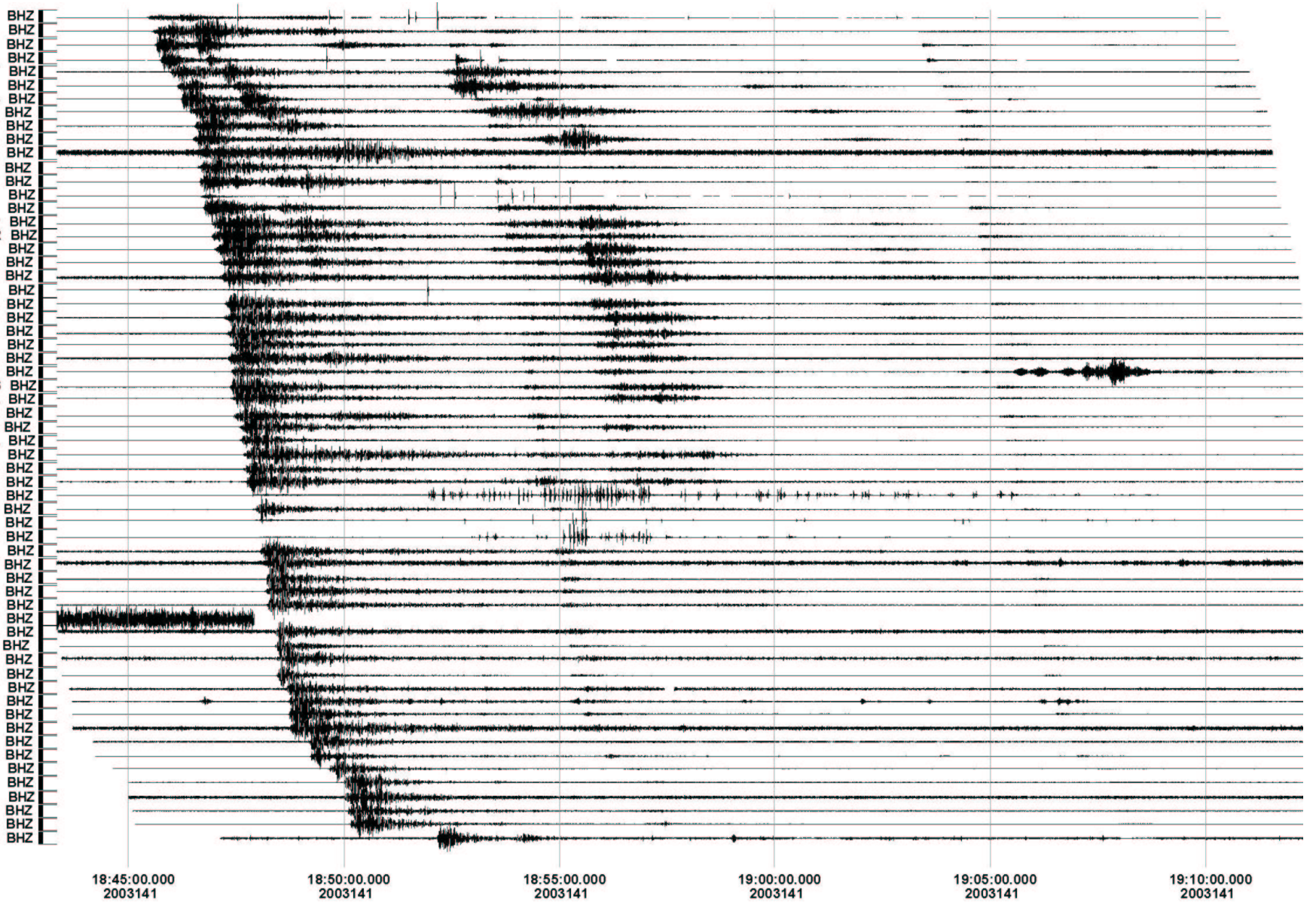
SPICE kick-off Sudelfeld

VEBSN

Algeria earthquake (21 May 2003)

KNMI

ORFEUS Data Center



2/24/2004

SPICE kick-off Sudelfeld

VEBSN

Algeria earthquake (21 May 2003)

V
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Table 1. MEREDIAN CONSORTIUM:

NL	Royal Netherlands Meteorological Institute (KNMI), De Bilt, The Netherlands
CZ	Geophysical Institute, Academy of Sciences Czech Republic, Prague, Czech Republic
ES	Instituto Geografico Nacional, Madrid, Spain
MN	MedNet, Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy
HL	National Observatory of Athens / Institute of Geodynamics, Athens, Greece.
GE	GEOFON, GeoForschungsZentrum Potsdam, Germany.
GE/PL	Geophysical Institute, Polish Academy of Sciences, Warschaw, Poland
FR	Centre National de la Recherche Scientifique, Nice, France.
OE	Zentralanstalt für Meteorologie und Geodynamic, Vienna, Austria.
CH	Eidgenössische Technische Hochschule Zürich, Switzerland.
NO	NORSAR, Kjeller, Norway.
SL	Environmental Agency of the Republic of Slovenia, Ljubljana
SK	Geophysical Institute, Slovak Academy of Sciences, Bratislava, Slovak Republic

Table 2. Additional participating observatories

GE	Geological Survey of Cyprus, Nicosia, Cyprus.
GE	Geological Survey of Estonia, Tallinn, Estonia.
G	Geoscope, Département de Sismologie, Institut de Physique du Globe, Paris, France.
FR	ReNaSS, Ecole et Observatoire des Science de la Terre, Strasbourg, France.
GR	German Regional Seismograph Network, Erlangen, Germany
GE	Geophysical Institute of Israel, Lod, Israel.
MN	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy
MN	Dipartimento di Scienze dellla Terra, University of Trieste, Italy.
GE	Universidad Complutense, Madrid, Spain
GE	Real Observatorio de la Armada, San Fernando, Spain
SS	Observatori de l'Ebre, Roquettes, Spain
GE	Bogazici University, Kandilli Observatory and ERI, Istanbul, Turkey.
II	IRIS/IDA network, University of California, Scripps Institute of Oceanography, USA.
IU	IRIS/USGS network, USGS Albuquerque Seismological Laboratory, USA.