

Site Characterization & Preparation Board Status and Organization



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for the WP4/SCB/SPB

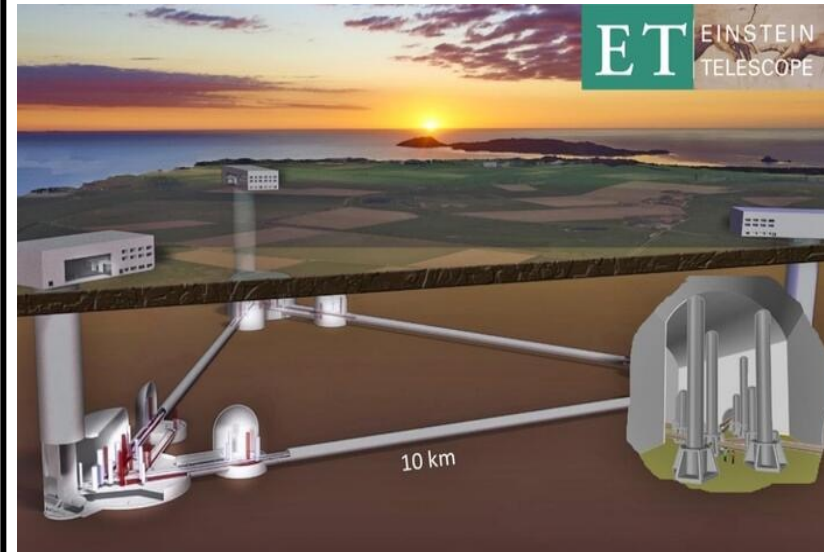
ET Candidate Site(s)

- Currently there are two sites, in Europe, candidate to host ET:
 - ❑ The Sardinia site, close to the Sos Enattos mine
 - ❑ The EU Regio Rhine-Meuse (EMR) site, close to the NL-B-D border
- A third option in Saxony (Germany) is under discussion



The Fabulous 2022

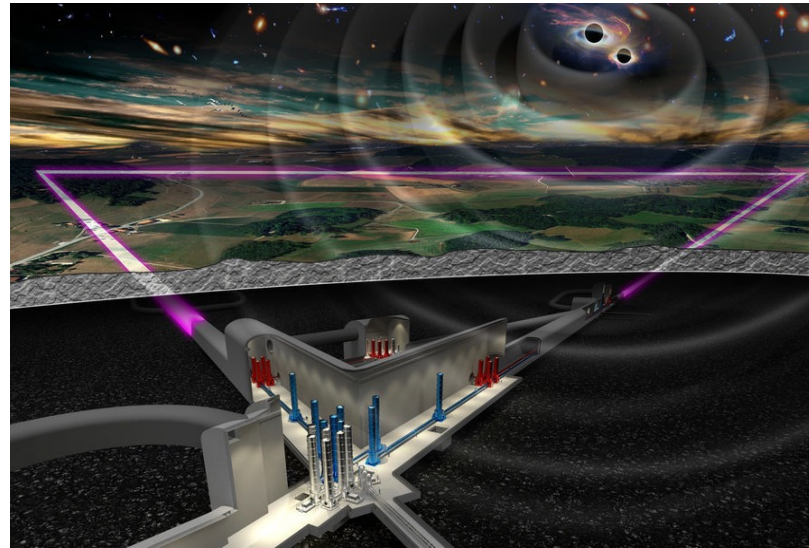
Sardegna: Italy



50 M€ for R&D/preparatory work

**R&D/preparatory work funding
Multi 100 M€ funding to host ET if in
Sardinia**

Euregio Meuse-Rhine: Netherlands



42 M€ for R&D/preparatory work

**R&D/preparatory work funding
Multi 100 M€ funding to host ET if in
the Euregio Meuse-Rhine**

2nd SPB Workshop, 23–26 Jan 2023

Saxony: Germany



New research center, ~ 170 M€/yr



Pressemitteilung

Forschung von Weltrang in der Lausitz

Deutsches Zentrum für Astrophysik – Forschung.
Technologie. Digitalisierung. (DZA) gewinnt Wettbewerb
zur Strukturförderung

SCB/SPB: General Mission

The SCB/SPB must lead the effort on the Einstein Telescope site related activities

- It must coordinate the activities to acquire the required characteristics for each site proposing to host the Einstein Telescope;
- Collect, organize and/or produce all the characterizations and documentation needed for a fair comparison of the sites;
- Propose a common framework and common basis for the evaluation of the candidate sites.

Site Characterisation/Preparation Board

ET Collaboration

Project Directorate
Fernando Ferroni – Andreas Freise –
Mario Martinez

WD1

*physical variables
&
characterisation*

WP1.1

seismic noise

WP1.2

*gravimetry
geodynamics*

WP1.3

magnetic noise

WP1.4

other env. noise

WD2

geology

WP2.1

structural geology

WP2.2

hydro-geology

WP2.3

geophysics

WP2.4

geotechnics

WD3

bidbooks

WD4

*costs, schedules
&
risk assessment*

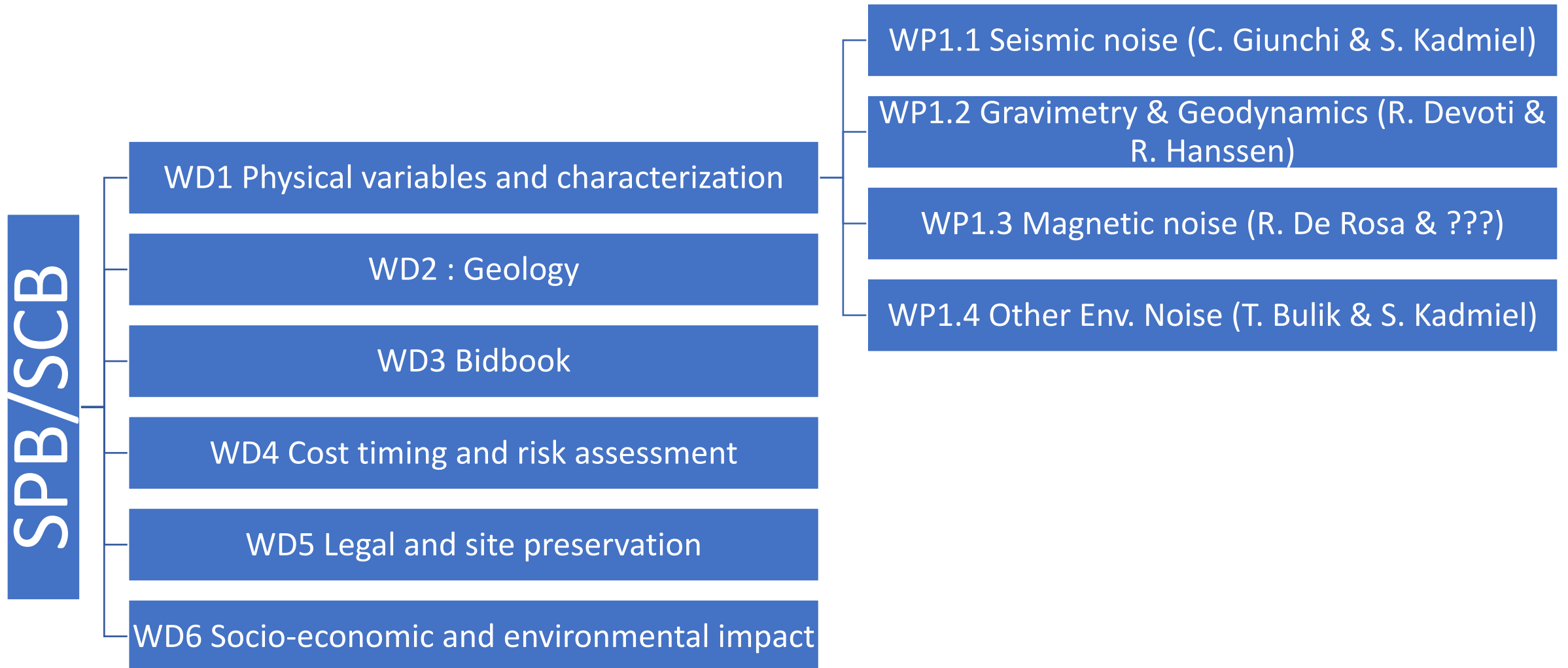
WD5

*legal issues
&
site preservation*

WD6

*socio-economic
& environmental
impact*

WD1 : Physical Variables and Characterization (L. Naticchioni, S. Kadmiel)



WD1 - Timeline

➤Milestones:

- ❑**M1.1:** physical variables needed for the site characterization and for the evaluation of their impact on the detector performances - Q1/2023
- ❑**M1.2:** measurements recommendations and standards (setup, sensors, procedures, best practices...) - Q1/2023
- ❑**M1.3:** data format standards and analysis tools - Q2/2023

➤Deliverables:

- ❑**D1.1:** quantification of sources impacting ET performances - Q4/2023

	Name	Duration	Start	Finish	Predec	
	WP4 Site Preparatio	352 days?	9/1/22 8:00 AM	1/5/24 5:00 PM		
	WD1	347 days?	9/1/22 8:00 AM	12/29/23 5:00 PM		
	M1.1	152 days?	9/1/22 8:00 AM	3/31/23 5:00 PM		
	M1.2	152 days?	9/1/22 8:00 AM	3/31/23 5:00 PM		
	M1.3	217 days?	9/1/22 8:00 AM	6/30/23 5:00 PM		
	D1.1	347 days?	9/1/22 8:00 AM	12/29/23 5:00 PM		

Half 2, 2022

Half 1, 2023

Half 2, 2023

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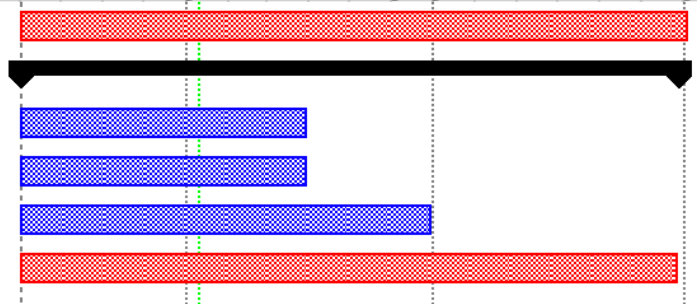
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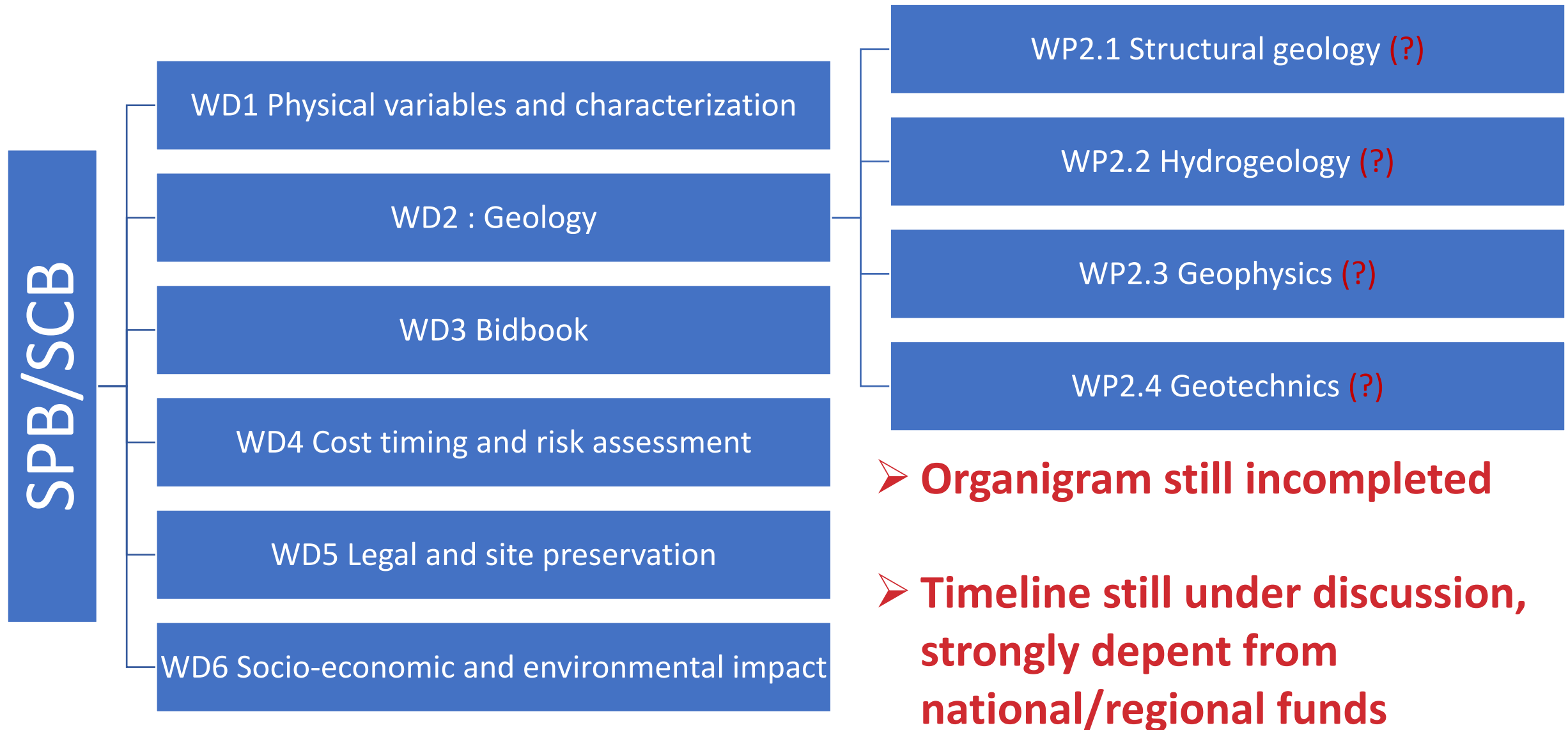
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WD2 : Geology (L. Casini, F. Ngueyen, W. Walk)



WD2 - Deliverables

- WP2.1 - Structural Geology:
 - ❑ geological model and maps
- WP2.2 - Hydrogeology:
 - ❑ Hydrogeological model
- WP2.3 - Geophysics:
 - ❑ Multimodal images of the subsurface
 - ❑ Petrophysical relationships (translation to hydro- or geotechnical parameters)
- WP2.4 – Geotechnics :
 - ❑ Geotechnical testing on core samples
 - ❑ Rock quality model for the tunnels and caverns

WD3: Bidbook (T. Bulik, ...)

- Still to be identified reference people for each host team
- Timeline still to be defined

Milestones:

- Define Bidbook standard format and content, i.e. needed legal documentation, procedures to realize the infrastructure, timing, cost (according with the Infrastructure team, Collaboration, Host teams), financial plan, ...

Deliverables:

- **D3.1** Bidbook template
- **D3.2** List of required documents

WD5: Legal issues and site preservation

Deliverables

- **D5.1** A list of required legal documents, needed for the realization of the ET infrastructure
- **D5.2** Report describing the consolidated strategy to preserve the site quality.

WD5: Legal issues and site preservation

Windturbines

Very popular, even more so with present electricity prices

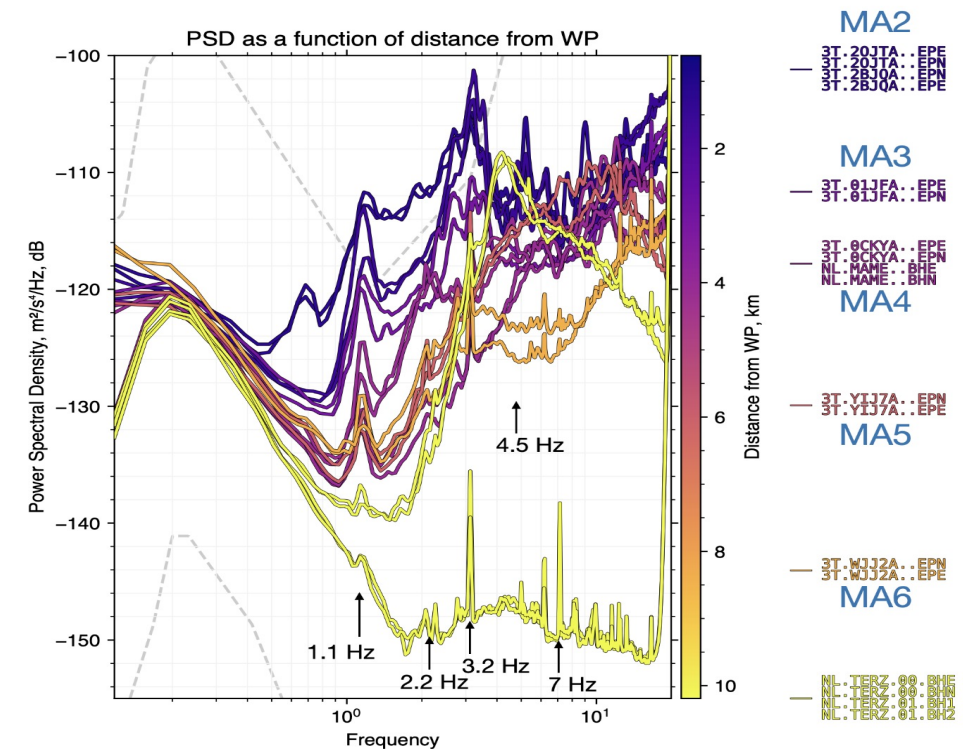


Figure 2: PSD as a function of distance from the wind park. The 1.1, 2.2, & 3.2 Hz peaks are consistently decreasing as a function of distance from the wind park. The yellow curves at just over 10 km distance from the wind park, were computed for station NL.TERZ, which hosts broadband seismometers at the surface and at 250 m deep in a steel cased borehole. The 4.5 Hz peak remains unexplained at this time and the 7 Hz peak, is most likely related to resonance in the steel casing.

WD5: Legal issues and site preservation

Windturbines

Very popular, even more so with present electricity prices



EMR

Netherlands:- ban on new windturbines

- discussions on future human activities that may affect ET performance adversely ongoing

Belgium:

- discussions ongoing with notably Engie (large windturbine supplier) regarding new initiatives.
- 2-3 existing initiatives challenged in court

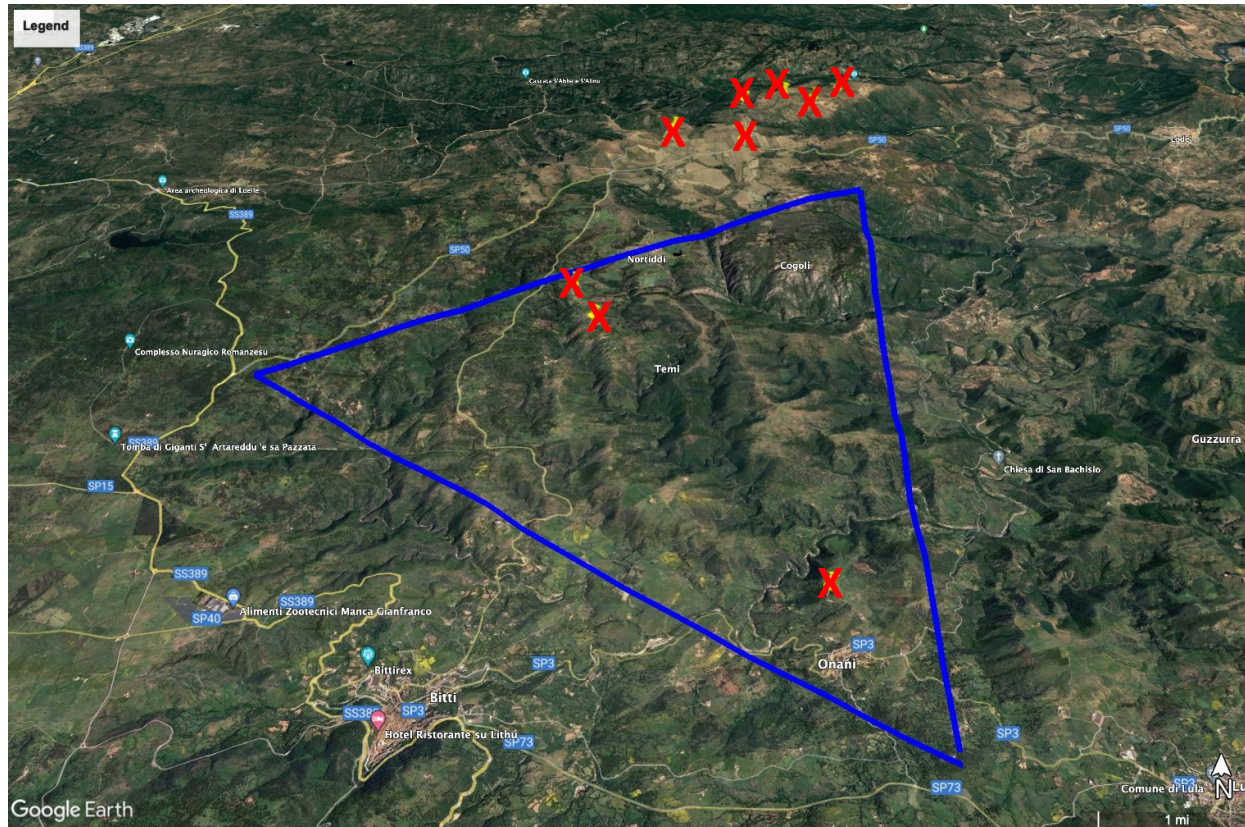
Germany: - ?

More measurement campaigns in preparation (with Engie)

WD5: Legal issues and site preservation

Windturbines

Very popular, even more so with present electricity prices



Sardinia

- several windturbine projects stopped
- discussions on future human activities that may affect ET performance adversely ongoing
- Recently a windturbine project got authorization (strong discussions on going among the national government/local communities and scientific community)
- Measurement campaigns in preparation with **existing windmills**

WD6: Socio-economic and env. impact

Deliverables:

- **D6.1** Document containing a set of standards in the computation of the socio-economic-environmental impact
 - ☐ common multipliers in the computation of the economic impact, or multipliers based on shared criteria
 - ☐ definition of a set of common categories to define the social impact
 - ☐ definition of a set of common categories to define the environmental impact

Next Urgent Steps

- **SPB organizational chart completion (urgent)**
 - ❑ WD1 almost completed
 - ❑ Many WDs still without chairs
- **Site Measurements**
 - ❑ windmills measurements
- **Site investigations on going, need streamlining between sites**

Next Urgent Steps

- Economic studies (founded by ET-PP)
- Site Cost estimation (strategy to be discussed with PD)
- Site Preservation Strategy Definition

Docs in preparation:

- General Strategy (ET-PP):
 - ❑ Concerns, challenges and requirements
 - ❑ Sites descriptions
 - ❑ Characterizations measurements description
 - ❑ standards
- site-specific characteristics that impact ET sensitivity and its duty cycle (ET-PP)
- physical variables needed for the site characterization (SPB-WD1)
- measurements recommendations and standards (SPB-WD1)

January 2023

2nd SPB Workshop: Agenda



	Sun 22	Mon 23	Tue 24	Wed 25	Thu 26	Fri 27
all-day						
9 AM		9 AM Introduction - 'Registration + Introductions', views from SPB co-chairs, view from ET management, links with Infradev ET/PP, COBA status i.e. L versus Triangle and SPB considerations herein, ET Bidbook preparations plannin...	9 AM WD1 - 'Impact on ET performance', including: ISB point of view, KAGRA experience, seismic,...	9 AM 'Site related issues', including: Cost/risk issues related to excavations (contacts with civil engineering firms), legal/ permitting/local population issues, environmental/ sustainability issues, socio-economic impact	9 AM Tour at ETpathfinder, boreholes, beer brewery	
10 AM						
11 AM			11 AM WD2 - 'Impacts on ET costs/ risks=excavations', including: Geological & Hydrogeological cam...			
Noon						
1 PM						
2 PM		2 PM WD1 - 'Impact on ET performance', including: ISB point of view, KAGRA experience, seismic, acoustic, magnetic measurements at sites, connections with external noise sources like sea, wind turbines, trains, roads/bridges, mining, etc., impact o...	2 PM WD2 - 'Impacts on ET costs/ risks=excavations', including: Geological & Hydrogeological campaigns (boreholes, passive seismic, active seismic, electromagnetic- and gravimetric imaging, etc.) and modelling, where do the sites stand w.r.t. ET implementation i.e. potential corner points, future investigations:...	2 PM 'Wrap up, Schedule, ...', including: Site differential implications on ET performance & ET costs/risks, realistic schedule estimates for each site, (urgently) required inputs (L versus Triangle?), actions required, conclusions		
3 PM						
4 PM						
5 PM						
6 PM						
7 PM						

Open Issues discussed in the workshop:

- ET geometry and the CoBa process
- Lusatia candidate site ?
- Effects of environmental noise on ET performances
 - Newtonian noise estimation