

AdriaArray Seismic Network

Petr Kolínský (Institute of Geophysics, Prague)

Thomas Meier (Uni Kiel)

&

AdriaArray Seismic Network Working Group

AdriaArray splinter meeting at EGU, hybrid, May 26, 2022

update May 27



INSTITUTE OF GEOPHYSICS
OF THE CZECH ACADEMY OF SCIENCES

Orfeus EPOS
EUROPEAN PLATE OBSERVING SYSTEM

permanent station inventory: sheet of 2517 stations and spots (rows) x 25 “properties” (columns)

StationInventory.xls - OpenOffice.org Calc

Soubor Úpravy Zobrazit Vložit Formát Nástroje Data Okno Nápověda

A1 = name

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	difficulty	
1	name	Name					town	city	previous sheet	round	name	corner in [sec]	yes=1/no=0	name	table if r1=wors	operator	institute	no=0	EID	center	GB	DS	sug	any			
2	Network	Name	Latitude	Longitude	elevation	show	Site name	country	Housing*	Sensor pos	Sensor type	Corner period	Possible spot*	Digitizer	Sampling	Qual	Institut	Struct	prelimin	DA	OA	no=0	Be	SN	sug		
3	Network	station	WGS84	WGS84	[m]		village /	country	see remark on	rock/corr	marketing	sensor low	if corner<60s	marking	marketing	higher	active	network	onlines	=IDA	de/da	Boh	DS	hrs	su		
79	HT	ALN	40.885	26.046	1	Alexandroupolis	GR	CMG-3ESP 100s (200)	100		Janus-Trident 40 Vpp (Gain 1)																
80	BW	ALTM	48.995167	11.519922	0	Beilngries	D	Le3D-1	1																		
81	HU	AMBH	46.350100	20.725800	1	Ambrozfalva	H	G120	120																		
82	HL	AMGA	36.831561	25.893836	1	Amorgosisland	GR	Building	concret	Lennartz20s+CMG-5T	20		0	SMART24	100	4	NOA	Evan	1	1	NOA	1	1				
83	HP	AMPL	38.9224	21.2135	1	Ampelaki	GR	Urban free field	concret	TrilCompact120s	120			Geobit SR32	100	3	UPAT	Soko	1	1	NOA	1	1				
84	RO	AMRR	44.6102	27.3351	67	Amara	RO	nderground shaft	concret	CMG40T	30	1	Q330	100	3	NIEP		1	0	0	0	0					
85	HP	AMT	37.5324	21.7089	1	Artemida	GR	Free field	bedrock	G120s	120			Guralp Minim	100	2	UPAT	Soko	1	1	NOA	1	1				
86	IV	AMUR	40.9071	16.6041	443	I	I		NANOMETRICS TRILL	40																	
87	ANAC		50.073800	17.378000	1	Anenský vrch	CZ		L43D	1																1	
88	IX	AND3	40.9298	15.3331	905	I	I		GEOTECH KS-2000ED	30																	
89	HL	ANKY	35.86704	23.30117	1	AntikythiraIsland	GR	Free field	bedrock	G60s	60			PS6-SC	100	1	NOA	Evan	1	1	NOA	1	1				
90	TH	ANNA	50.88902	12.64499	0		D		CMG-3ESPC 60s	60																	
91	BE	ANSA	50.668	5.507	180	0	Ans	B	A		1																
92	KO	ANTB	36.8998	30.6538	20	0	TR			120	120																
93	HP	ANX	38.5933	21.9209	1	AnoXora	GR	Urban free field	concret	G120s	120			Guralp DM24	100	2	UPAT	Soko	1	1	NOA	1	1				
94	IV	AOI	43.55017	13.602	530	I	I		NANOMETRICS TRILL	40																	
95	HT	AOS2	39.1478	23.8436	1	Alonissos-2	GR		CMG-3ESP 100s (200)	100				Janus-Trident 40 Vpp (Gain 1)													
96	HL	APE	37.07274	25.52301	1	Apeiranthos,Naxos	GR	Special	bedrock	STS2	120			PS6-SC	100	1	NOA	Evan	1	1	NOA	1	1				
97	IV	APEC	43.55846	12.41991	488	I	I		NANOMETRICS TRILL	40																	
98	IV	APPI	46.47868	11.22813	1056	I	I		LENNARTZ LE3D-5S	5																	
99	IV	APRC	41.75738	15.54308	672	I	I		NANOMETRICS TRILL	120																	
100	MN	AQU	42.354	13.405	1	L'Aquila, Italy	I		STS2	120																	
101	FR	ARBF	43.491700	5.332500	1	technopole de l'Arbois - 13001,	F		STS2	120																	
102	CA	ARBS	42.434492	1.533754	0		E		G120	120																	
103	RO	ARCB	44.4667	26.0758	125	1	Arcul de Triumf	RO	building	concret	Episensor_2g_2_5vfs	2	1	k2	100	4	NIEP		1	0	0	0	0				
104	IV	ARCI	42.8519	11.4754	1080	I	I		NANOMETRICS TRILL	40																	
105	NL	ARCN	51.5013	6.1942	0	0	NL			CMG3ES																	
106	RO	ARCR	47.0855	24.3537	385	1	Arcalia	RO	nderground shaft	concret	STS2	120		Q330	100	3	NIEP		1	0	0	0	0				
107	HL	ARG	36.21356	28.1212	1	Archagelos,Rhodes	GR	Special	bedrock	Lennartz20s	20	0	DR24	100	2	NOA	Evan	1	1	NOA	1	1					
108	KO	ARMT	40.5683	28.866	320	0	TR			120s,	120																
109	RO	ARR	45.3657	24.8332	871	1	Vidru	RO	special	bedrock	CMG3ESP	59		Q330	100	3	NIEP		1	1	NIEP	1	1				
110	IV	ARRO	42.57917	12.76567	253	1	I			LENNARTZ LE3D-5S	5																
111	OE	ARSA	47.250500	15.523200	1	Arzberg, Steiermark	A		STS2	120																	
112	FR	ARTF	43.588200	5.806700	1	Artigues - 83006 - Var - Provence	F		Trillium 120PH	120																	
113	IV	ARVD	43.49807	12.94153	461	I	I		NANOMETRICS TRILL	40																	
114	RO	ASE	44.4445	26.0904	85	1	Academia de Studii Economice	RO	building	concret	Episensor_2g_2_5vfs	2	1	k2	100	4	NIEP		1	0	0	0	0				
115	IV	ASOL	45.8003	11.9023	181	I	I		KINEMETRICS EPISE	1																	
116	IV	ASQU	43.7967	11.7893	860	I	I		NANOMETRICS TRILL	120																	
117	IV	ASSB	43.0426	12.6587	734	I	I		NANOMETRICS TRILL	40																	
118	HA	ATAL	38.6926	23.0213	1	Atalanti	GR		G120s	120				100		NKUA	G.Ka	1	1	NOA	1	1					
119	IV	ATBU	43.47571	12.54828	1000	I	I		LENNARTZ LE3D-5S	5																	
120	IV	ATCC	43.18514	12.63994	557	I	I		KINEMETRICS EPISE	1																	
121	FR	ATE	43.085800	-0.700700	0	Arette - 64040 - Pyrenees-Atlantique	F		STS2	120																	
122	IV	ATFO	43.3666	12.5715	960	I	I		NANOMETRICS TRILL	40																	
123	HL	ATH	37.97384	23.71767	1	Athens	GR	Special	bedrock	STS2	120			DR24	100	1	NOA	Evan	1	1	NOA	1	1				
124	HA	ATHU	37.9665	23.7845	1	AthensUniversity	GR		G60s	60				100		NKUA	G.Ka	1	1	NOA	1	1					
125	IV	ATLO	43.31516	12.40726	584	I	I		LENNARTZ LE3D-5S	5																	

- Python script (352 lines) to distill the required information from the sheet
 - produces files for plotting by GMT (script 1428 lines)

```
File Edit Selection View Go Run Terminal Help extract.py - Visual Studio Code [Administrator]
listsCONT.py countingLISTS.py extract.py make_inventory_manual.py main.py station_pair.py
d: > AdriaArray > stations > xmaps2 > extract.py
85         citacBB30 = citacBB30 + 1
86         outBB30.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # s
87         csvBB30.write ('%s\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + '\t'))
88         csvBB3030.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',30'))
89         csvBB3040.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',40'))
90         labBB30.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
91     # BB30 out
92     if inventory.iloc[n,5] == 0 and inventory.iloc[n,11] >= 30 and inventory.iloc[n,11] < 40: # to
93         citacBB30 = citacBB30 + 1
94         outBB30.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # st
95         labBB30.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
96     # BB 40 in
97     if inventory.iloc[n,5] == 1 and inventory.iloc[n,11] >= 40 and inventory.iloc[n,11] < 59: # to
98         citacBB40 = citacBB40 + 1
99         outBB40.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # s
100        csvBB40.write ('%s\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + '\t'))
101        csvBB4030.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',30'))
102        csvBB4040.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',40'))
103        labBB40.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
104    # BB 40 out
105    if inventory.iloc[n,5] == 0 and inventory.iloc[n,11] >= 40 and inventory.iloc[n,11] < 59: # to
106        citacBB40 = citacBB40 + 1
107        outBB40.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # st
108        labBB40.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
109    # BB 60 in
110    if inventory.iloc[n,5] == 1 and inventory.iloc[n,11] >= 59: # to
111        citacBB60 = citacBB60 + 1
112        outBB60.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # s
113        csvBB60.write ('%s\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + '\t'))
114        csvBB6030.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',30'))
115        csvBB6040.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',40'))
116        labBB60.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
117    # BB 60 out
118    if inventory.iloc[n,5] == 0 and inventory.iloc[n,11] >= 59: # to
119        citacBB60 = citacBB60 + 1
120        outBB60.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # st
121        labBB60.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t'))
122    # UNKN in
123    if inventory.iloc[n,5] == 1 and math.isnan(inventory.iloc[n,11]) and math.isnan(inventory.iloc[n,12]): # to
124        citacUNKN = citacUNKN + 1
125        outUNKN.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # sta
126        labUNKN.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t') + ' ' + )
127        csvUNKN.write('"%s"\n' % (str(inventory.iloc[n,2]) + ' ' + str(inventory.iloc[n,3]) + ',10'))
128    # UNKN out
129    if inventory.iloc[n,5] == 0 and math.isnan(inventory.iloc[n,11]) and math.isnan(inventory.iloc[n,12]): # to
130        citacUNKN = citacUNKN + 1
131        outUNKN.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]))) # st
132        labUNKN.write ('%s\n' % (str(inventory.iloc[n,3]) + ' ' + str(inventory.iloc[n,2]) + '\t') + ' ' + )
133    # SPOT - always in
134    if math.isnan(inventory.iloc[n,11]) and inventory.iloc[n,12] == 1: # pokud je corner pr
135        citacSPOT = citacSPOT + 1
```

when the „final“ version of inventory and scripts are ready,
they will be **freely available** for anyone for plotting the station maps

```
PPSPad [D:\16AdriaArray\stations\xmaps2\figAdria.sh]
Soubor Projekt Úpravy Hledat Zobrazit Formát Nastroje Skripty HTML Nastavení Okno Nápověda
1. aktuality.html 2. uskutečnene20.html 3. folyzko20.html 4. menu.html 5. zapisy.html 6. index.html 7. fero.css 8. orbita.sh 9. global.sh availableMap.sh figMap.sh figDensity.sh figAdriaGP.sh
9 10 20 30 40 50 50 70 80 90 100 110 120
dos2unix pNOSP.txt
pxsy pNOSP.txt -R -JL -St$sizeps -G$nbsp -W$thps$/Sblock -K -O >> $psfile01 # vyhodit pro Renatu
pxsy pNOSP.txt -R -JL -St$sizeps -G$nbsp -W$thps$/Sblock -K -O >> $psfile10 # vyhodit pro Renatu
dos2unix pWHIT.txt
dos2unix pWHIT0.txt
pxsy pWHIT0.txt -R -JL -St$sizeps -G$whit -W$thps$/Sblock -K -O >> $psfile01
pxsy pWHIT0.txt -R -JL -St$sizeps -G$whit -W$thps$/Sblock -K -O >> $psfile10
pxsy pWHIT0o.txt -R -JL -St$sizezet -W$thot$/Swhit -K -O >> $psfile01 # cut
pxsy pWHIT0o.txt -R -JL -St$sizezet -W$thot$/Swhit -K -O >> $psfile10 # cut
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam0) pWHIT.txt' > circlesWHIT30.dat
awk -v awk_diam40=$diam40 '(print $1, $2, "0.0" awk_diam40 " " awk_diam40) pWHIT.txt' > circlesWHIT40.dat
dos2unix pSPOT.txt
pxsy pSPOT.txt -R -JL -St$sizeps -G$spot -W$thps$/Sblock -K -O >> $psfile01 # vyhodit pro Renatu
pxsy pSPOT.txt -R -JL -St$sizeps -G$spot -W$thps$/Sblock -K -O >> $psfile10 # vyhodit pro Renatu
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam30) pSPOT.txt' > circlesSPOT30.dat
awk -v awk_diam40=$diam40 '(print $1, $2, "0.0" awk_diam40 " " awk_diam40) pSPOT.txt' > circlesSPOT40.dat
dos2unix pUNKN.txt
dos2unix pUNKN0.txt
pxsy pUNKN.txt -R -JL -St$sizeps -G$unkn -W$thps$/Sblock -K -O >> $psfile01
pxsy pUNKN.txt -R -JL -St$sizeps -G$unkn -W$thps$/Sblock -K -O >> $psfile10
pxsy pUNKN0.txt -R -JL -St$sizezet -W$thot$/Sunkn -K -O >> $psfile01
pxsy pUNKN0.txt -R -JL -St$sizezet -W$thot$/Sunkn -K -O >> $psfile10
pxsy pUNKN0.txt -R -JL -St$sizeps -G$unkn -W$thps$/Sblock -K -O >> $psfile02
pxsy pUNKN0.txt -R -JL -St$sizezet -W$thot$/Sunkn -K -O >> $psfile02
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam0) pUNKN.txt' > circlesUNKN30.dat
awk -v awk_diam40=$diam40 '(print $1, $2, "0.0" awk_diam40 " " awk_diam40) pUNKN.txt' > circlesUNKN40.dat
dos2unix pUPGR.txt
pxsy pUPGR.txt -R -JL -St$sizeps -G$upgr -W$thps$/Sblock -K -O >> $psfile01
pxsy pUPGR.txt -R -JL -St$sizeps -G$upgr -W$thps$/Sblock -K -O >> $psfile10
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam30) pUPGR.txt' > circlesUPGR30.dat
awk -v awk_diam40=$diam40 '(print $1, $2, "0.0" awk_diam40 " " awk_diam40) pUPGR.txt' > circlesUPGR40.dat
dos2unix PACASEstay.txt
awk '(print $3, $2)' PACASEstay.txt > stations-PACASEstay.txt
pxsy stations-PACASEstay.txt -R -JL -St$sizeps -G$pce -W$thps$/Sblock -K -O >> $psfile01 # tady muze umazato to "stay" a namal
pxsy stations-PACASEstay.txt -R -JL -St$sizeps -G$pce -W$thps$/Sblock -K -O >> $psfile10 # tady muze umazato to "stay" a namal
awk -v awk_ts=$ts '(print $3, $2, awk_ts " 0.0 TC", $1)' PACASEstay.txt > stations-PACASEstayLABEL.txt
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam0) stations-PACASEstay.txt' > circlesPCSE30.dat
awk -v awk_diam40=$diam40 '(print $1, $2, "0.0" awk_diam40 " " awk_diam0) stations-PACASEstay.txt' > circlesPCSE40.dat
dos2unix pbB30.txt
dos2unix pbB300.txt
pxsy pbB30.txt -R -JL -St$sizeps -G$b30 -W$thps$/Sblock -K -O >> $psfile01
pxsy pbB300.txt -R -JL -St$sizezet -W$thot$/Sb30 -K -O >> $psfile01
pxsy pbB300.txt -R -JL -St$sizeps -G$b30 -W$thps$/Sblock -K -O >> $psfile10
pxsy pbB300.txt -R -JL -St$sizezet -W$thot$/Sb30 -K -O >> $psfile10
pxsy pbB300.txt -R -JL -St$sizezet -G$outs -W$thps$/Sblock -K -O >> $psfile09
pxsy pbB300.txt -R -JL -St$sizeps -G$b30 -W$thps$/Sblock -K -O >> $psfile02
pxsy pbB300.txt -R -JL -St$sizezet -W$thot$/Sb30 -K -O >> $psfile02
pxsy pbB300.txt -R -JL -St$sizeps -G$perm -W$thps$/Sblock -K -O >> $psfile06
pxsy pbB300.txt -R -JL -St$sizeps -G$perm -W$thps$/Sblock -K -O >> $psfile03
pxsy pbB300.txt -R -JL -St$sizeps -G$perm -W$thps$/Sblock -K -O >> $psfile07
pxsy pbB300.txt -R -JL -St$sizeps -G$perm -W$thps$/Sblock -K -O >> $psfile08
awk -v awk_diam30=$diam30 '(print $1, $2, "0.0" awk_diam30 " " awk_diam0) pbB30.txt' > circlesBB3030.dat
```

permanent stations - properties of interest:

sensor corner period	< 30s
	=> 30 s and < 40 s (effectively = 30 s)
	=> 40 s and < 60 s (effectively = 40 s)
	=> 60 s

binary properties:

EIDA	yes / no
online	yes / no
StationBook	yes / no
FDSN	yes / no
inside the region	yes / no (to flexibly change the AdriaArray outline)
for upgrade	yes / no (if corner <= 30 s)

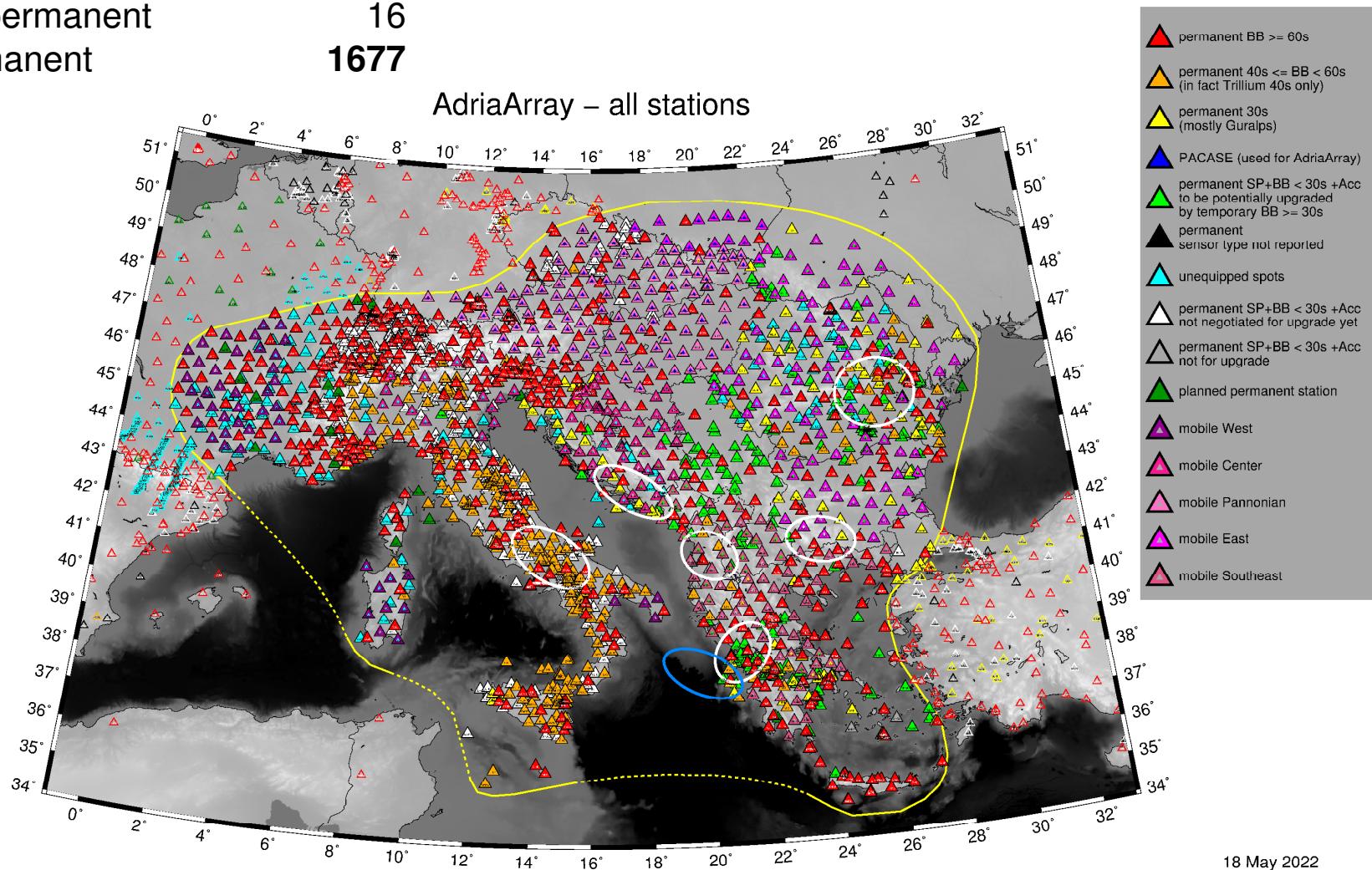
idea: whenever you change or add a line (station properties) in the inventory,
- you run the Python script
- and you get an updated map by the GMT script

Adria Array – all permanent stations - update May 2022

inside AdriaArray region:

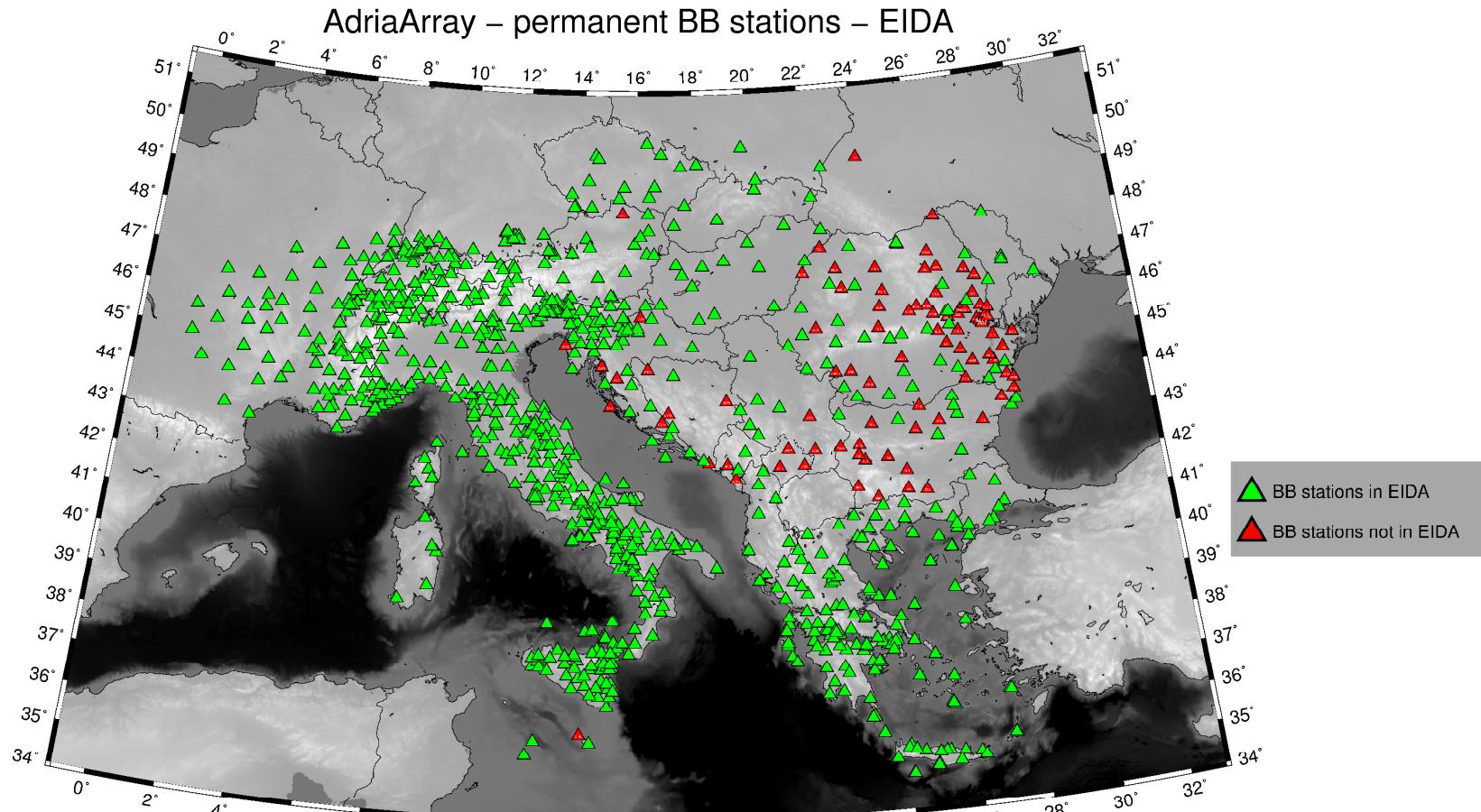
BB (>= 30s)	967
SP+SM for upgrade	259
SP+SM others	450
unknown	1
planned permanent	16
total permanent	1677

(there are 2300+ stations on the map
including those outside the AdriaArray region)



from that **1677** permanent stations, **1384** are already in EIDA (82.5%)
=> 293 are not in EIDA (BB+SP+SM)
out of these 293,
89 BB permanent stations need to be connected to EIDA

HOMEWORK: if there is a new non-EIDA permanent station built since we communicated the last time (2019/2020/2021/2022), please, share the information with me, as I cannot find that station otherwise and connect it to EIDA!



AdriaArray

Seismic Network

Working Group

(May, 2022)

50 participating institutions from **27** countries

(alphabetical order by countries)

seismic network preparatory steps:

- 1 permanent stations in the region
- 2 availability of the mobile stations
- 3 distribution of mobile stations
- 4 iterate 1 – 3 to update

2019 – 2020 – 2021 – 2022 ...

IGEWE-PUT, Tirana, Albania
Uni Vienna, Austria
ZAMG, Austria
SC FHMZ, Sarajevo, Bosnia and Herzegovina
GS Republic of Srpska, Bosnia and Herzegovina
BAS, Bulgaria
CSS, Zagreb, Croatia
Uni Zagreb, Croatia
Charles Uni, Prague, Czech Republic
IG, CAS, Prague, Czech Republic
IPE, Masaryk Uni, Brno, Czech Rep.
IRSM, CAS, Prague, Czech Republic
Uni Aarhus, Denmark
Uni Helsinki, Finland
Uni Oulu, Finland
Uni Grenoble, France
Observatoire Midi Pyrénées, France
Uni Bochum, Germany
GEOMAR Kiel, Germany
GFZ Potsdam, Germany
Uni Kiel, Germany
Uni Karlsruhe, Germany
Uni Münster, Germany
Uni München, Germany
Uni Frankfurt, Germany
NOA, Greece/ORFEUS
Uni Thessaloniki, Greece
Uni Patras, Greece
EPSS, Hungary
INGV, Italy
OGS, Trieste, Italy
GS Kosovo, Pristina, Kosovo
Uni Sts. Cyril and Methodius, Skopje, N. Macedonia
Uni Malta
IGS-CES, Chisinau, Moldova
MSS, Podgorica, Montenegro
Uni Twente, The Netherlands
Norwegian Broadband Pool, Norway
IG PAS, Warsaw, Poland
Uni Silesia, Katowice, Poland
Uni Warszawa, Poland
NIEP, Romania
ESI SAV, Bratislava, Slovakia
SSS, Ljubljana, Slovenia
ICTJA-CSIC, Barcelona, Spain
ETH, Zürich, Switzerland
IoG, NAS, Ukraine
ORFEUS

mobile stations available

Uni Vienna, Austria	30
Croatian Seismological Survey	19
IG, Czech Republic	50
IRSM, Czech Republic	4 + local experiment
Uni Aarhus, Denmark	19 + local experiment
Uni Helsinki, Finland	20
Uni Oulu, Finland	10
Resif-Sismob, France	35
Germany DSEBRA+	114 + local on-shore/off-shore experim.
EPSS, Hungary	15
OGS, Italy	6
INGV, Italy	local experiment
INGV, Italy, Bologna	1
Uni Twente, the Netherlands	7+
Norwegian Broadband Pool+UniZagreb	12+
IG+Warszawa+Silesia, Poland	29
Barcelona, Spain	10
ETH, Switzerland	20
total available	401+ mobile stations

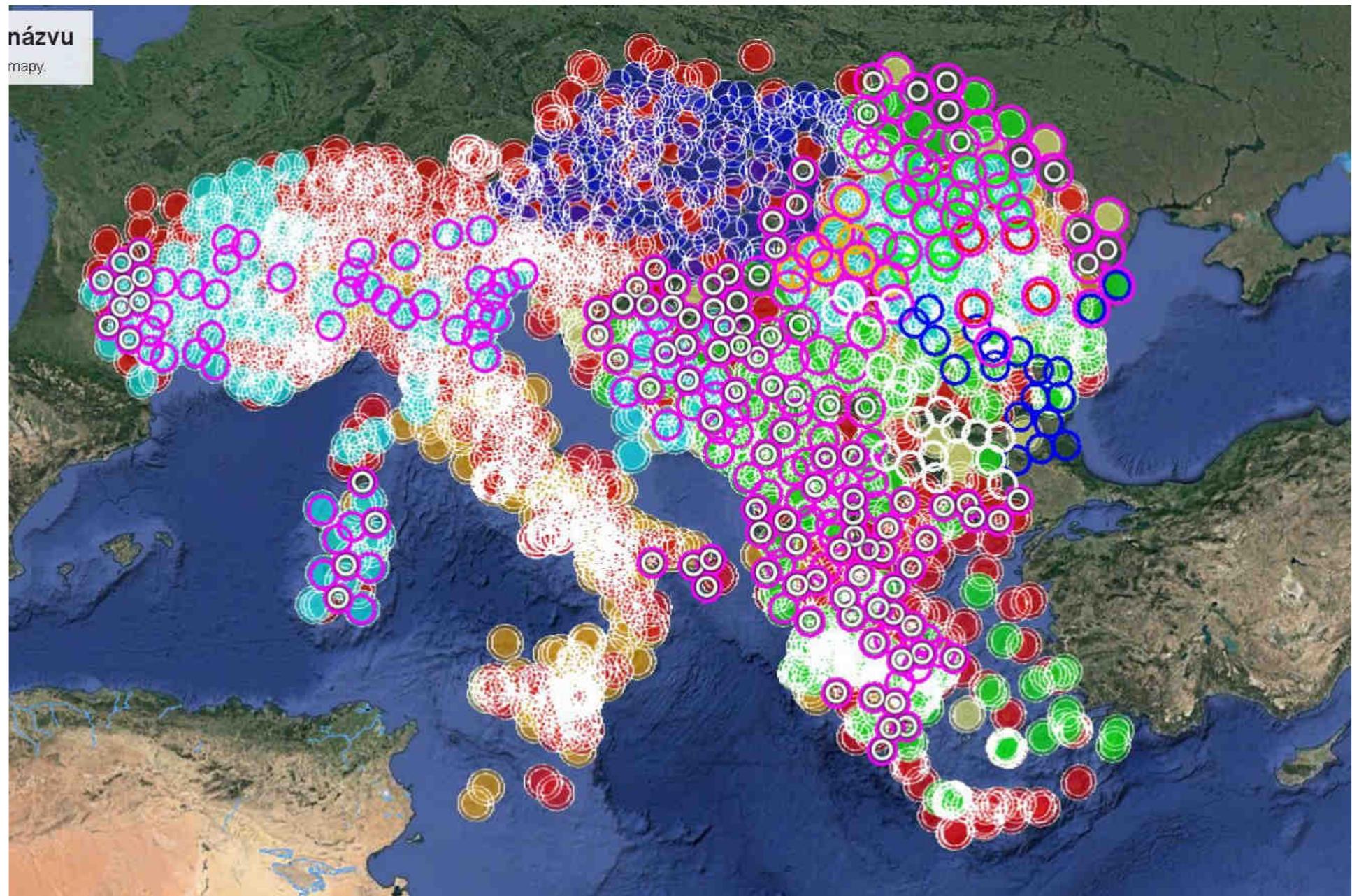
	MOBILES	REGION	already in place			136			
EAST	Poland	Ukr.-Carp.	Ukr.-Coast	Moldavia	Romania	Bulgaria	sum columns	available	spare
IG CzechRep					8	10	18	18	0
IRSM Czech Rep					4		4	4	0
Denmark					4	15	19	19	0
Helsinki					16		16	20	4
???				3			3	0	-3
Oulu					9		9	10	1
???			2				2	0	-2
Poland	13	14					27	29	2
							98	100	2
sum of rows	13	14	2	3	41	25	98 sums	available	spare
needed	13	14	2	3	41	25	98 needed		
30s NOT replaced									
PANNONIAN	CzechRep	Austria	Slovakia	Hungary	Serbia	Germany	sum columns	available	spare
UniWien		17	9				26	30	4
IG CzechRep	11		21				32	32	0
Hungary PACASE			11				11	11	0
Hungary new			4				4	4	0
Kiel		15	15		8		38	40	2
							111	117	6
sum of rows	11	32	30	30	0	8	111 sums	available	spare
needed	11	32	30	30	0	8	111 needed		
CENTRE	Croatia	BiH	N. Italy	Slovenia			sum columns	available	spare
NorwPool+Zag	10						10	12	2
CroSeismSurvey	19						19	19	0
ETH		20					20	20	0
OGS			6				6	6	0
INGV Bologna			1				1	1	0
the Netherlands			9				9	7	-2
							65	65	0
sum of rows	29	20	16	0			65 sums	available	spare
needed	29	20	16	0			65 needed		
SOUTHEAST	Albania	N. Macedonia	Montenegro	Kosovo	Greece		sum columns	available	spare
Bochum		13			40		53	54	1
Munich	10		7	3			20	20	0
							73	74	1
sum of rows	10	13	7	3	40		73 sums	available	spare
needed	10	13	7	3	40		73 needed		
WEST	Apulia	Sicily	Sardinia	Massif Cent.	Switzerland		sum columns	available	spare
Spain	4		9				13	10	-3
France			35				35	35	0
							48	45	-3
sum of rows	4	0	9	35	0		48 sums	available	spare
needed	4	0	9	35	0		48 needed		
							total needed	395 total available	401
								total spare	6

numbers:

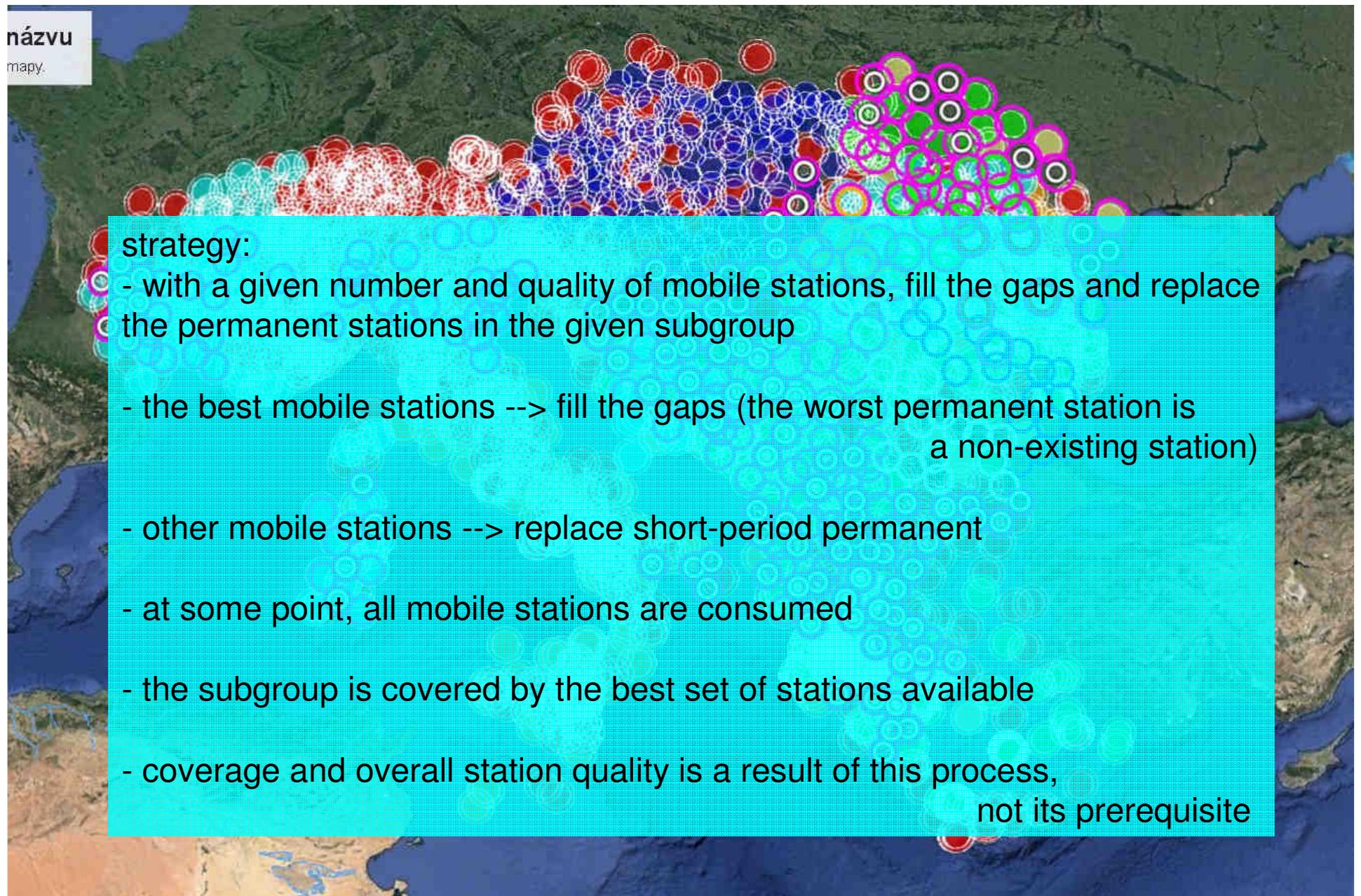
we need **395** temporary stations

136 out of these 395 ARE ALREADY deployed as the PACASE project
meaning, “only” **259** stations to go!

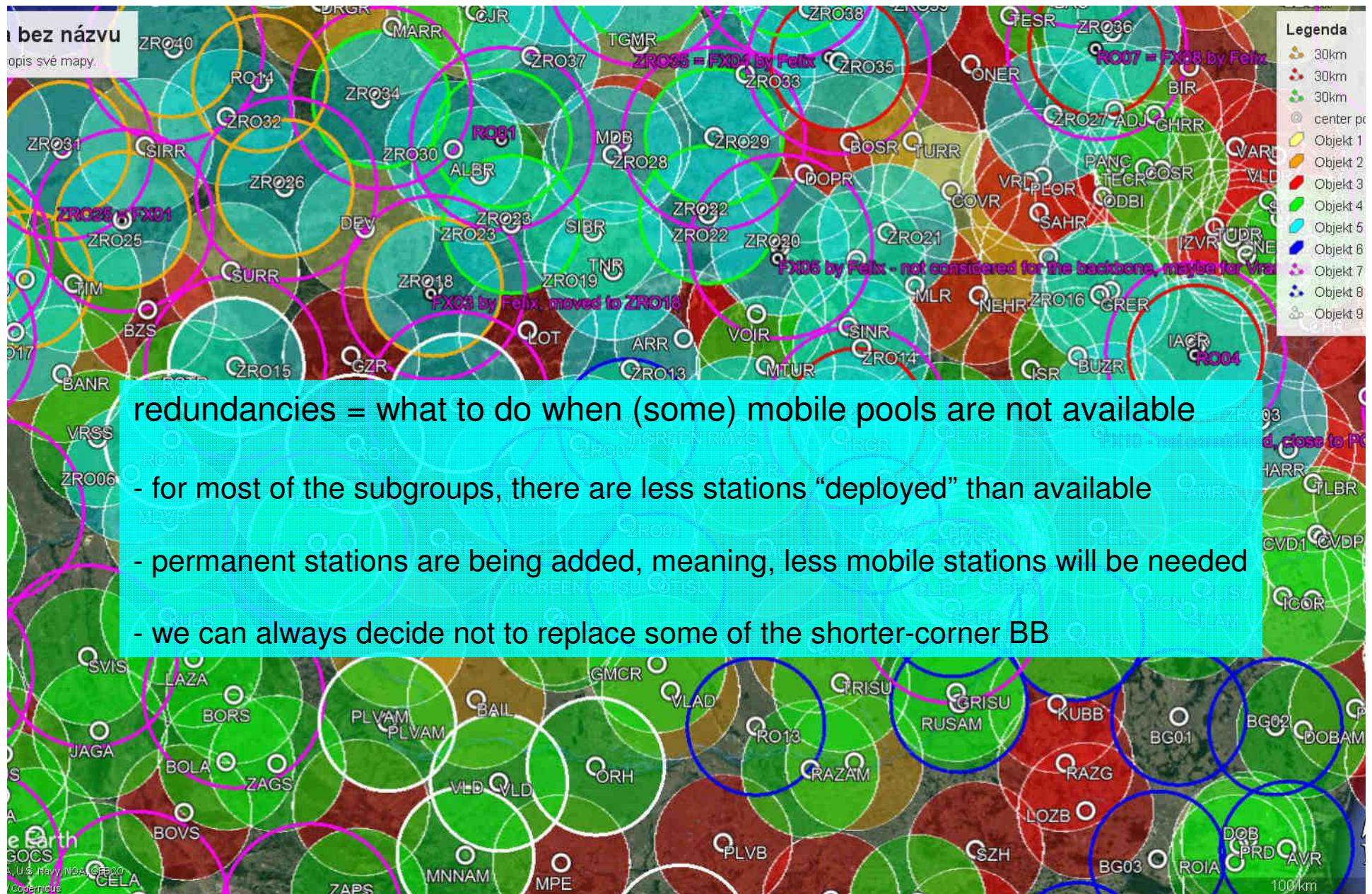
deployment of mobile stations – handmade in GoogleEarth



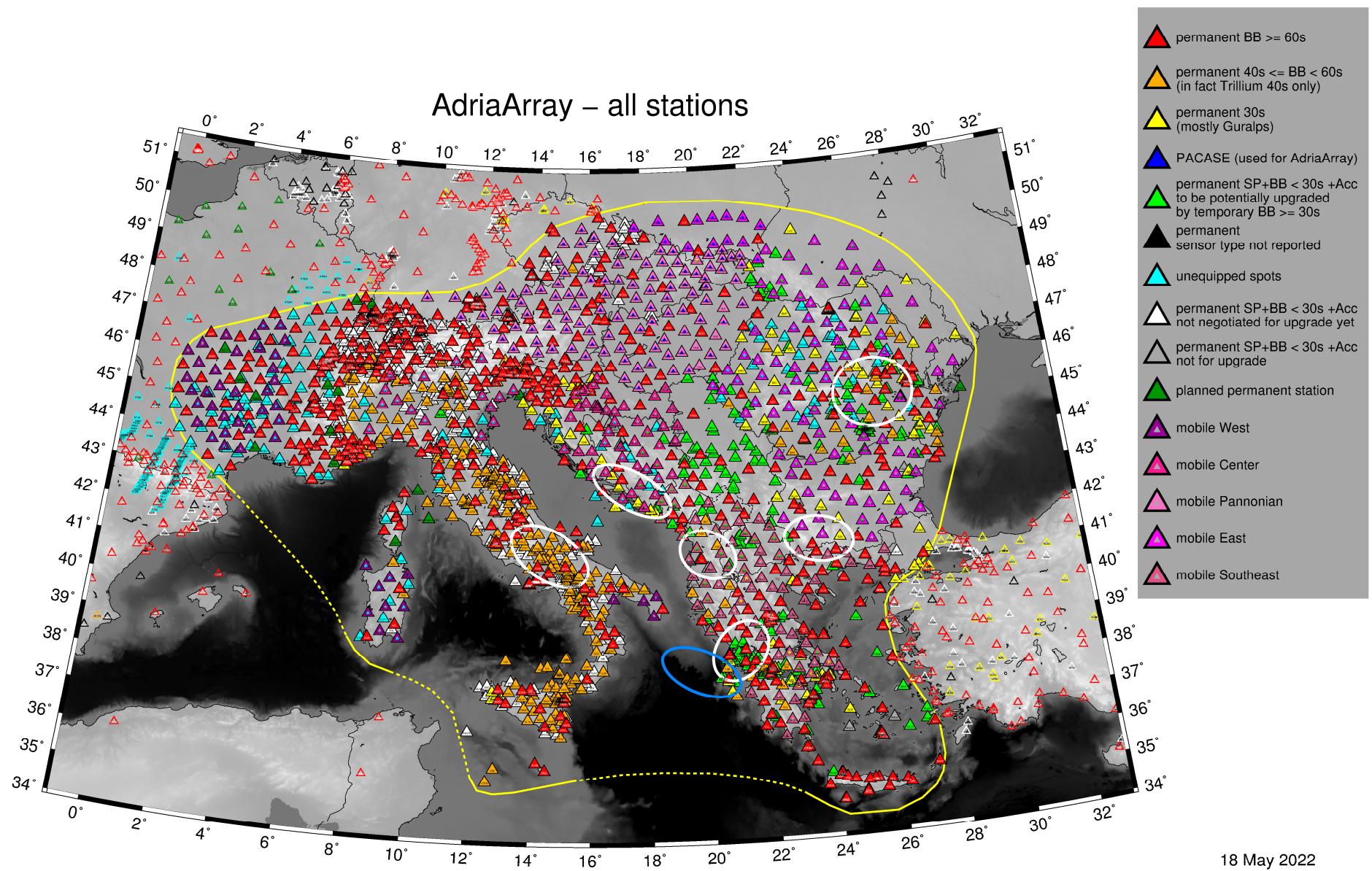
deployment of mobile stations – handmade in GoogleEarth

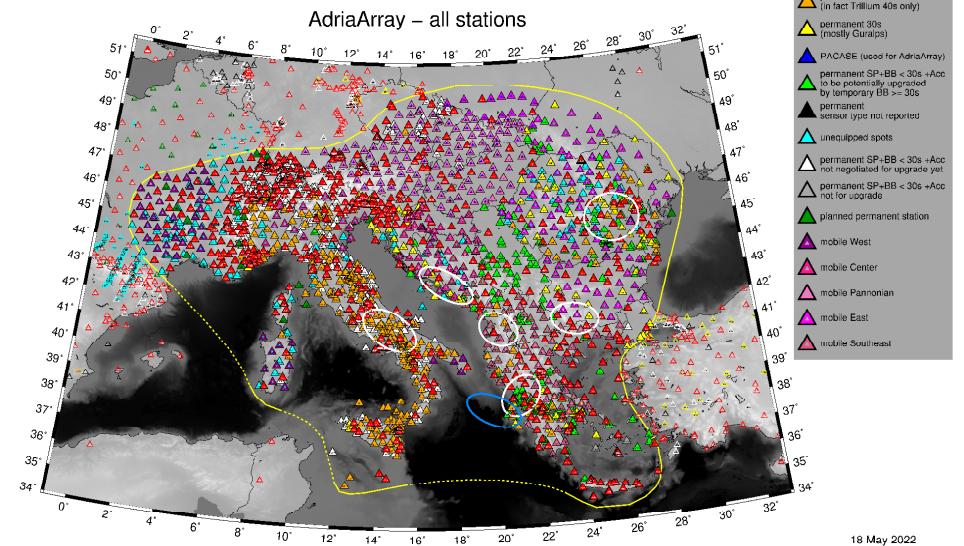
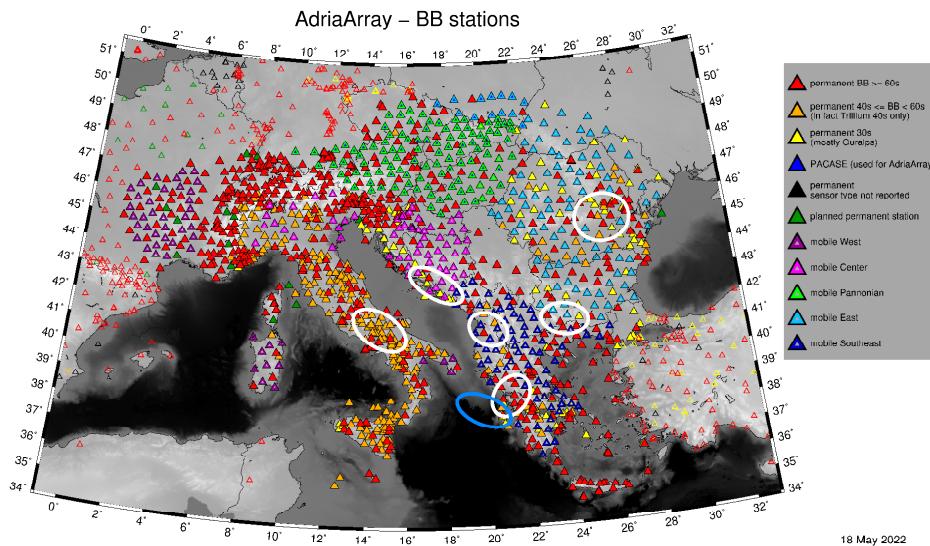


deployment of mobile stations – handmade in GoogleEarth

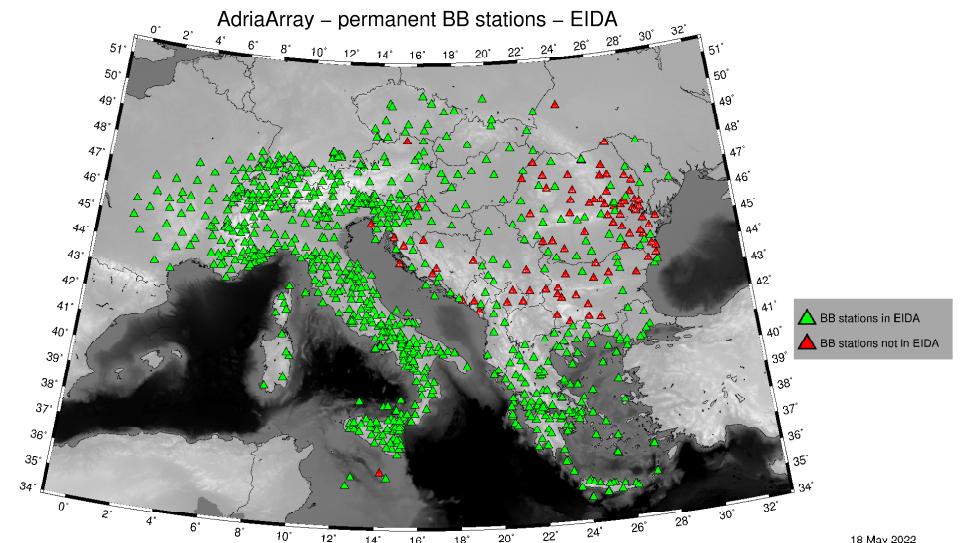
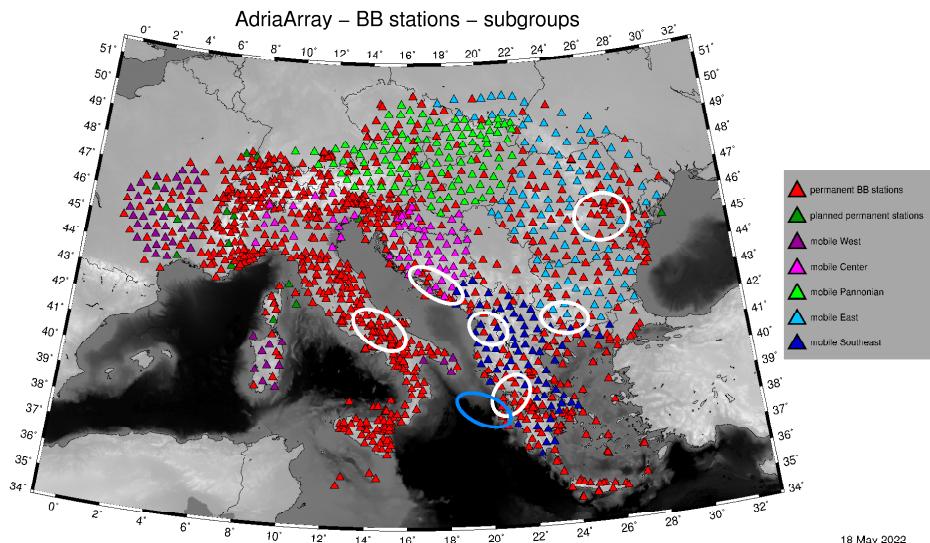


Adria Array – all permanent stations + mobile stations





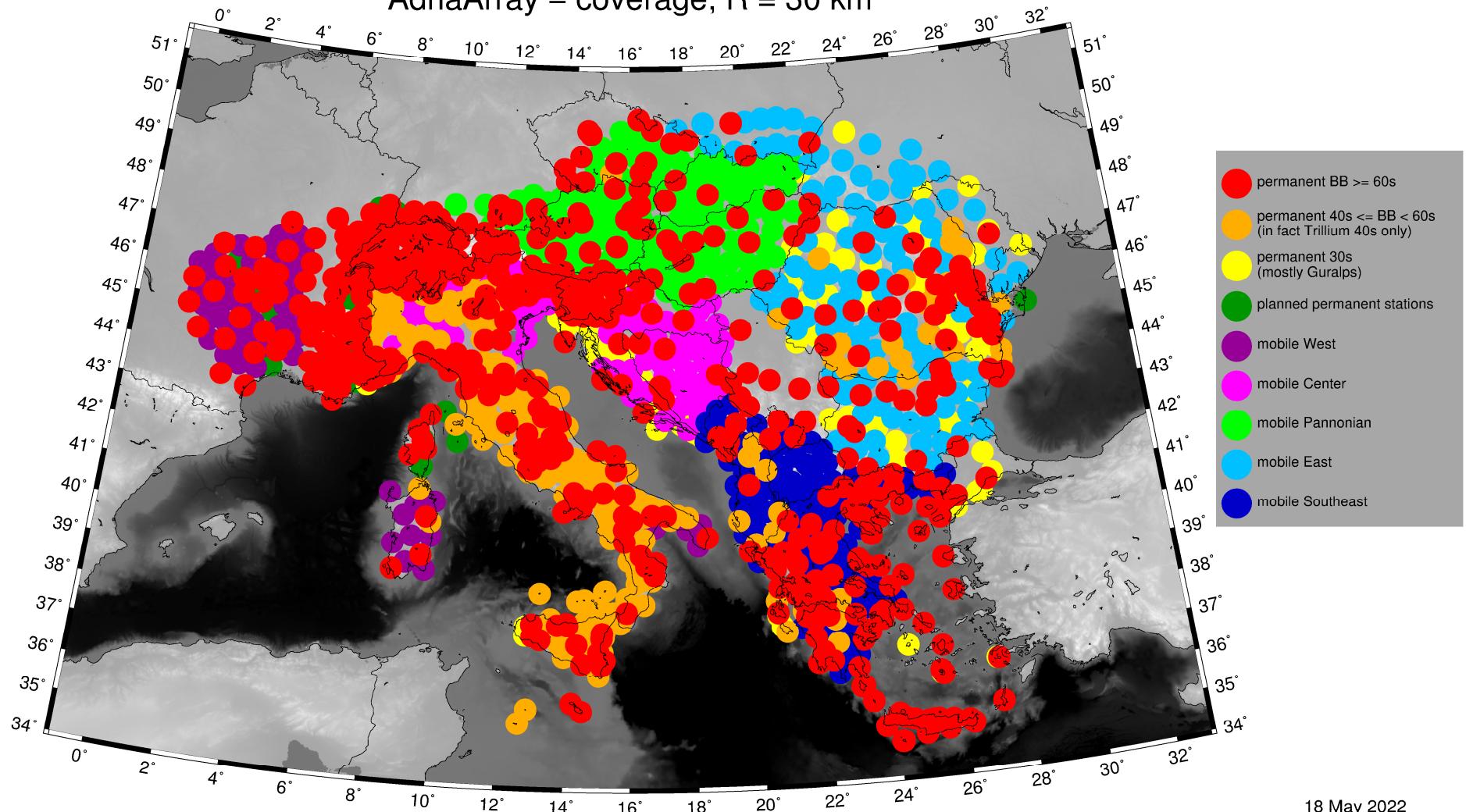
various versions of the map – different levels of information plotted



coverage

30 km

AdriaArray – coverage, $R = 30$ km

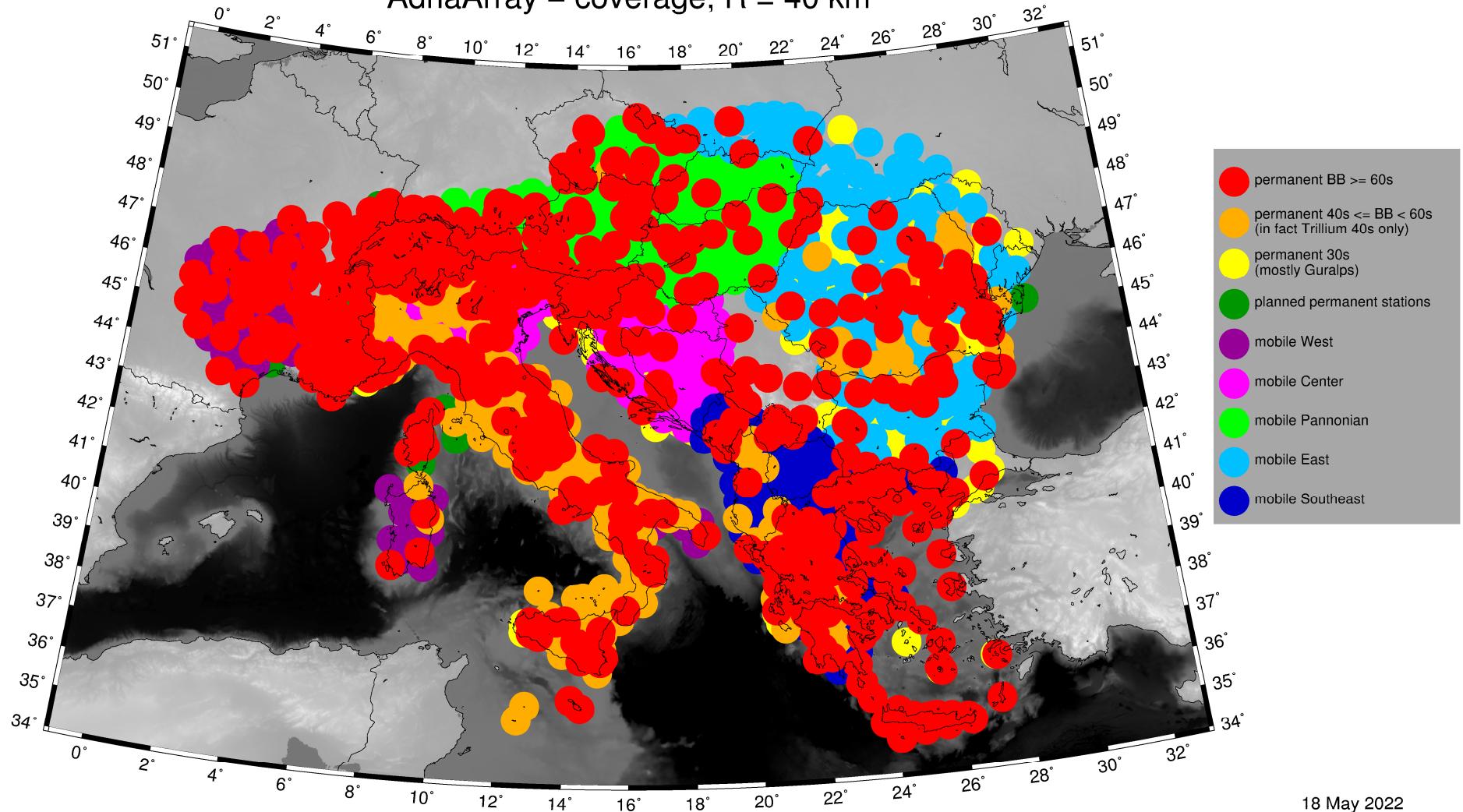


18 May 2022

coverage

40 km

AdriaArray – coverage, $R = 40$ km



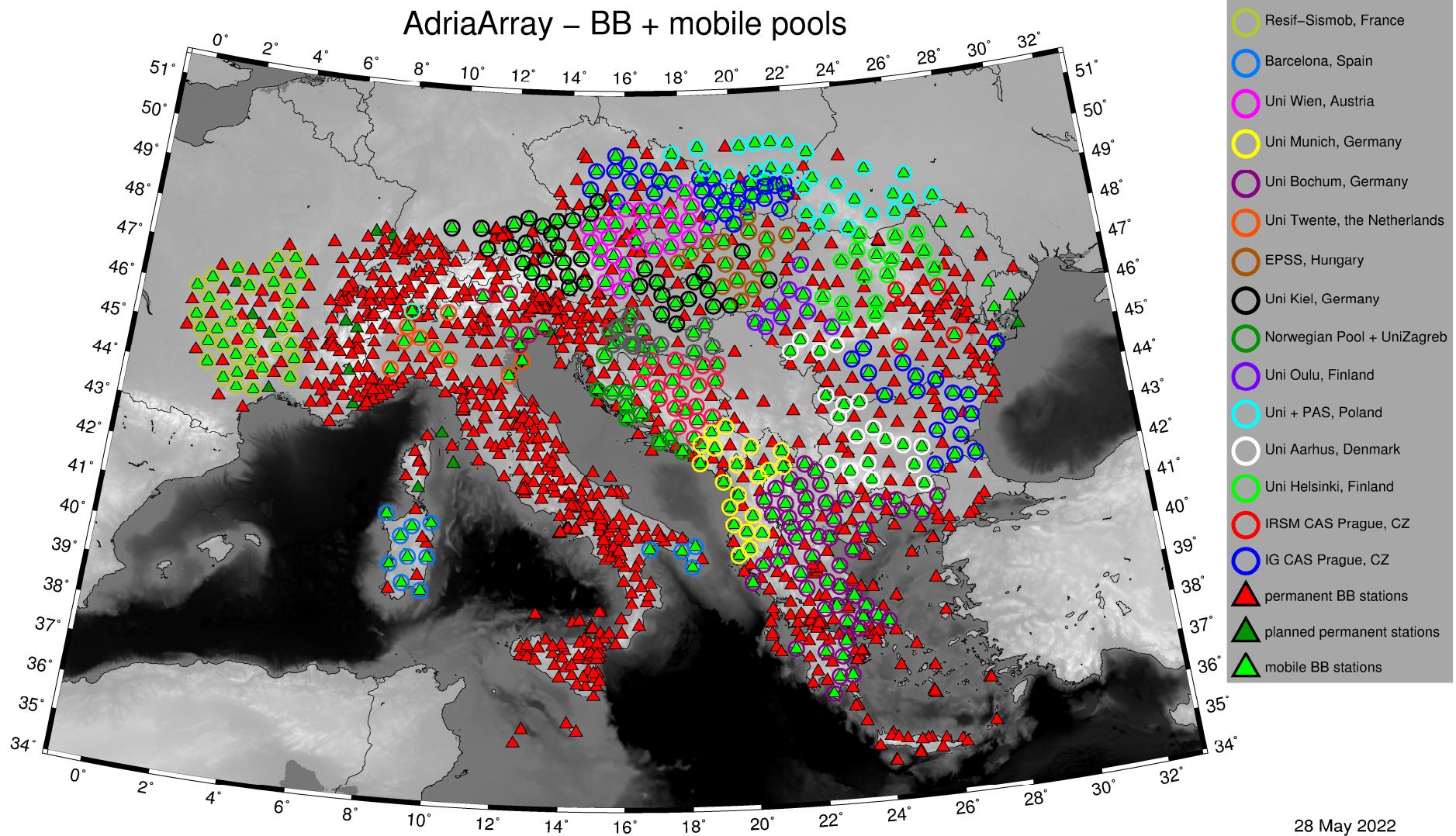
18 May 2022

mobile pools assigned to the stations

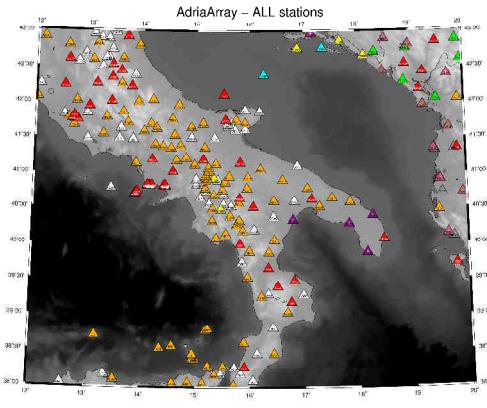
395 BB mobile stations

967 BB permanent stations

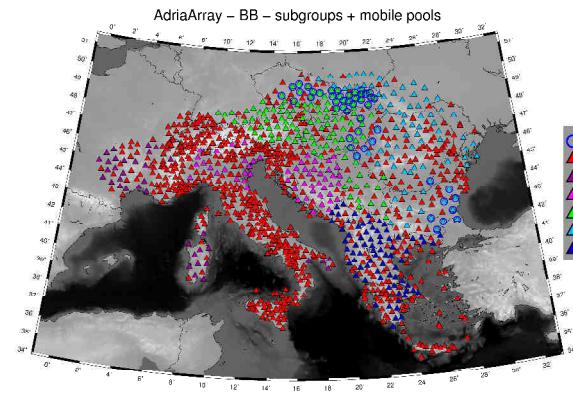
--> **1362 BB stations in total**



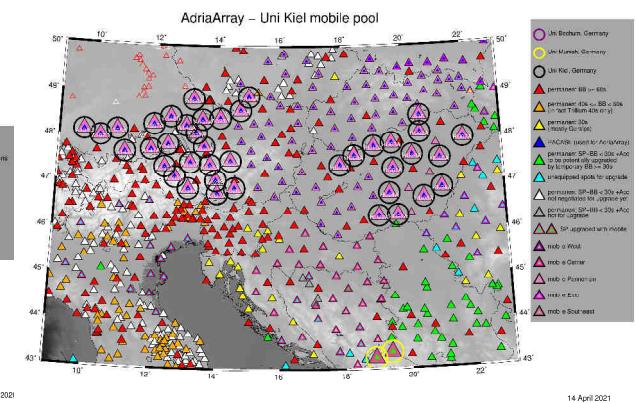
examples of maps to support project proposals



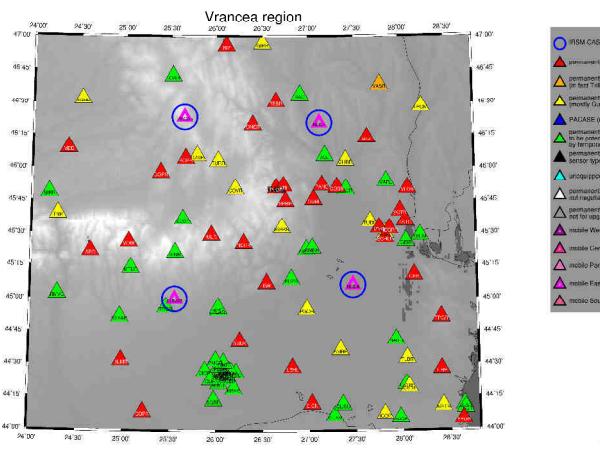
INGV



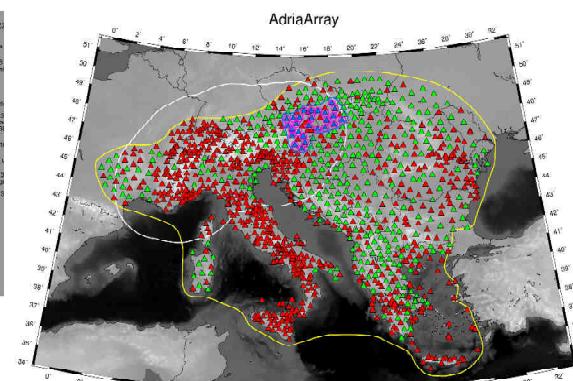
IG CAS CZ



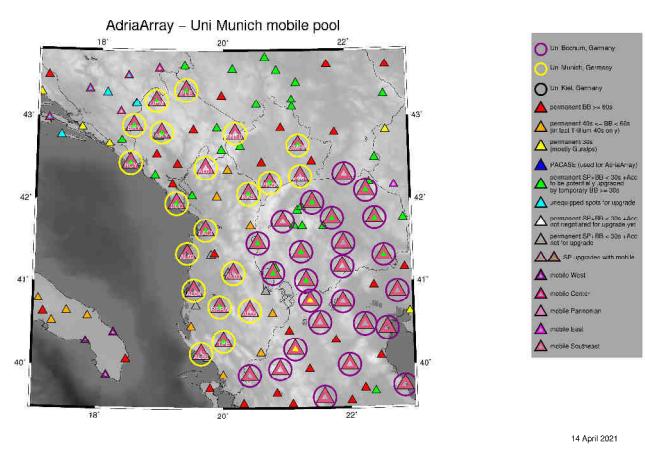
Uni Kiel



IRSM CAS CZ



Uni Wien



Uni Munich

current task: table of contacts

ready for the subregion “East”, under construction for the other parts

Temporary networks – subregion „East“

mobile pool	country	contact person	host institution	host country	contact person	stations	network code	EIDA node	begin of deployment	end of deployment	state of funding
IG CAS	CZ	Petr Kolínský	NIEP	RO	Felix Borleanu	8		Prague/NIEP	April/May 2022	April 2024	funded
		Petr Kolínský	NIGGG BAS	BG	Lili Dimitrova	10		Prague/NIEP	April/May 2022	April 2024	funded
IRSM CAS	CZ	Renata Lukešová	NIEP	RO	Felix Borleanu	4		NIEP	summer 2022		institutional funds
UniHelsinki	FIN	Timo Tiira	NIEP	RO	Cristian Neagoe	16		NIEP	June/July 2022	+2 yrs	stations funded
???			NIEP / IGS	MD	Cristian Neagoe	3		NIEP			???
UniOulu	FIN	Hanna Silvennoinen	NIEP	RO	Cristian Neagoe	9		NIEP	late summer/autumn 2022		funded
UniAarhus	DK	Thorsten Nagel	NIEP	RO	Cristian Neagoe	4		NIEP	planned July/August 2022	+2 yrs	pending
		Thorsten Nagel	NIGGG BAS	BG	Lili Dimitrova	15		NIEP	planned July/August 2022	+2 yrs	pending
IG PAS, UniWarsz, UniSilesia	PL	Wojciech Czuba Piotr Środa	IoG NAS	UA	Bohdan Kuplyovsky	14		Warsz/NIEP	June/July 2022		stations funded
		Wojciech Czuba Piotr Środa	IG PAS,UniWarsz,Uni Silesia	PL	Wojciech Czuba Piotr Środa	13		Warsz/NIEP	deployed		funded
???			IoG NAS	UA		2		NIEP			???
					total stations	98					

mobile pool	num of local stations	local experiment	needed	spare	deployed	June 1/2	June 2/2	July	August	September	October
Uni Vienna, Austria	30		26	4	26						
Croatian Seismological Survey DEPLOYED	15		15	0	15						
Croatian Seismological Survey	4		4	0							
IG, Czech Republic DEPLOYED	32		32	0	32						
IG, Czech Republic	18		18	0							
IRSM, Czech Republic	4	yes	4	0							
Uni Aarhus, Denmark	19	yes	19	0							
Uni Helsinki, Finland	20		16	4							
Uni Oulu, Finland	10		9	1							
Resif-Sismob, France	35		35	0							
Germany DSEBRA+ DEPLOYED Kiel/Munich	38		38	0	38						
Germany DSEBRA+ Munich	22		20	2							
Germany DSEBRA+ Bochum	54		53	1							
EPSS Hungary DEPLOYED	11		11	0	11						
EPSS Hungary	4		4	0							
OGS, Italy	6		6	0							
INGV, Italy, Bologna	1		1	0							
Uni Twente, the Netherlands	7		9	-2							
Norwegian Broadband Pool+UniZagreb	12		10	2							
IG+Warszawa+Silesia, Poland DEPLOYED	13		13	0	13	all 29 Polish stations are now deployed in Poland					
Barcelona, Spain	10		13	-3							
ETH, Switzerland	20		20	0							
total	385		376		135						
			needed		deployed						

2023

status:

- overview of permanent stations in the region is ready (and continuously updated)
- the mobile stations are existing and available
- the local network operators are willing to accept and support
 - the installation of the mobile stations
- the local networks and the mobile pool operators are willing to exchange data
 - within the AdriaArray Initiative
- some groups have got already funding
- suggestion of mobile station distribution is ready (with some redundancy)

memorandum of collaboration (MoC):

- to be signed on June 17, 2022

plans:

- other groups are in the process of applying for funding this year (2022)
- the anticipated time for the installation of the mobile stations
 - is 2 years within 2022-2024
- the plans have to be adjusted according to the pandemic

fieldwork:

- starts in June 2022 – two weeks from now
 - Romania, Bulgaria, Bosnia and Herzegovina, ...



INSTITUTE OF GEOPHYSICS
OF THE CZECH ACADEMY OF SCIENCES

Orfeus EPOS
EUROPEAN PLATE OBSERVING SYSTEM

several mobile pools are to be deployed in near future

June: ETH --> Bosnia and Herzegovina

 IG Prague --> Romania + Bulgaria

July: Uni Helsinki --> Romania

 ... and others follow soon



ORFEUS + EPOS

support from Orfeus/EPOS is crucial for the AdriaArray

AdriaArray idea and Orfeus/EPOS are aiming
in the same direction, focusing on different aspects

infrastructure + science + networking

- archival of data at regional EIDA nodes
- support to AdA workshops via EPOS SP

Datacenter ID	Description and Focus Region
ODC - KNMI	European-Mediterranean, Netherlands
GFZ	European, Global, temporary deployments
RESIF	France + Global temporary deployments
INGV	Italy, European-Mediterranean (MedNet)
ETHZ	Switzerland
BGR	Germany
LMU	Germany (BayernNetz)
NIEP	Romania
KOERI	Turkey
NOA	Greece
UIB - NORSAR	Norway
ICGC	Spain

from the Orfeus web page:

ORFEUS

Observatories & Research Facilities for European Seismology

ORFEUS is the non-profit foundation to coordinate and promote digital, broadband seismology in the European-Mediterranean area.

EIDA is the European Integrated Data Archive infrastructure within ORFEUS to provide access to seismic waveform data in European archives.

- guidelines for quality control and data management being developed

acknowledgements

Maps plotted using GMT by Wessel, P., Smith, W. H. F., Scharroo, R., Luis, J. F. and Wobbe, F., 2013: Generic Mapping Tools: Improved version released, EOS Trans. AGU, 94, 409-410.

AlpArray stations by the AlpArray Working Group www.alparray.ethz.ch.

Permanent stations by national seismological services and ORFEUS-EIDA.

Big thanks to all the network operators for supplying the permanent station information.

PACASE station information thanks to György, Jarka and Antje.

Thanks to Orfeus + Epos for supporting AdriaArray.

petr.kolinsky@ig.cas.cz



INSTITUTE OF GEOPHYSICS
OF THE CZECH ACADEMY OF SCIENCES

Orfeus EPOS
EUROPEAN PLATE OBSERVING SYSTEM