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CREDO Inauguration, Kraków, 30 August 2016

CREDO: mission organized for super-preshowers

Cosmic-Ray Extremely Distributed Observatory



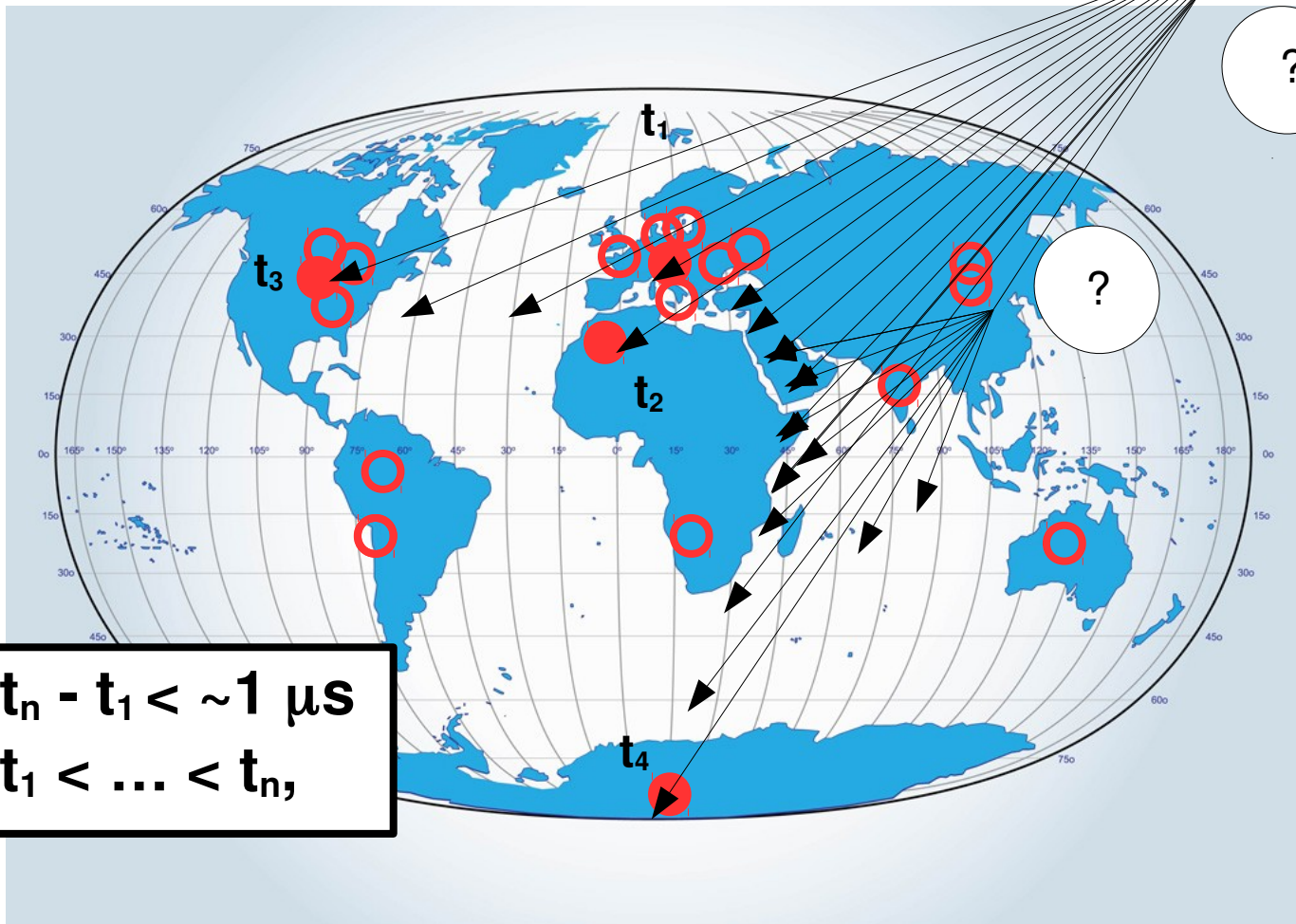
Central database/interface: access to everything for everybody

CREDO idea

Looking for super-preshowers class C & D



Citizens
strengthen
trigger
capabilities
of the
educational
arrays with
**smartphone
networks**



γ_{UHE}
(e.g. 10^{20}eV)

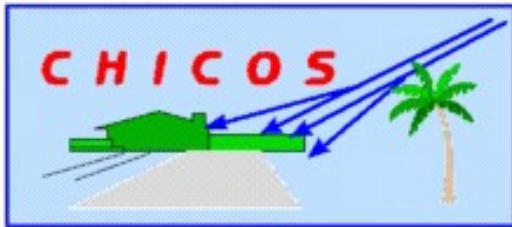
Citizens
browse the
data looking
for „improbable”
**time-space
coincidences**

- 1) $t_n - t_1 < \sim 1 \mu\text{s}$
- 2) $t_1 < \dots < t_n,$

- **indirect search for New Physics manifestations!**
- **verification of „classic” QED predictions (preshower @ Sun)**

Prototypes exist(ed)

Educational CR detectors (networks):



...

(-): not 100% active, purely educational, mono-technique, not global

(+): HiSPARC alive and expanding (several sites in Netherlands + UK + Denmark)

→ **how to stay alive and keep on growing?**

Smartphones as CR detectors:



(+): CRAYFIS (arXiv:1410.2895): observing UHECR with smartphones (+ radio tuners?)

(-): M. Unger, G. Farrar (arXiv:1505.04777): infeasible, too low user density

→ **which / how many additional detectors needed to make the smartphone network useful?**

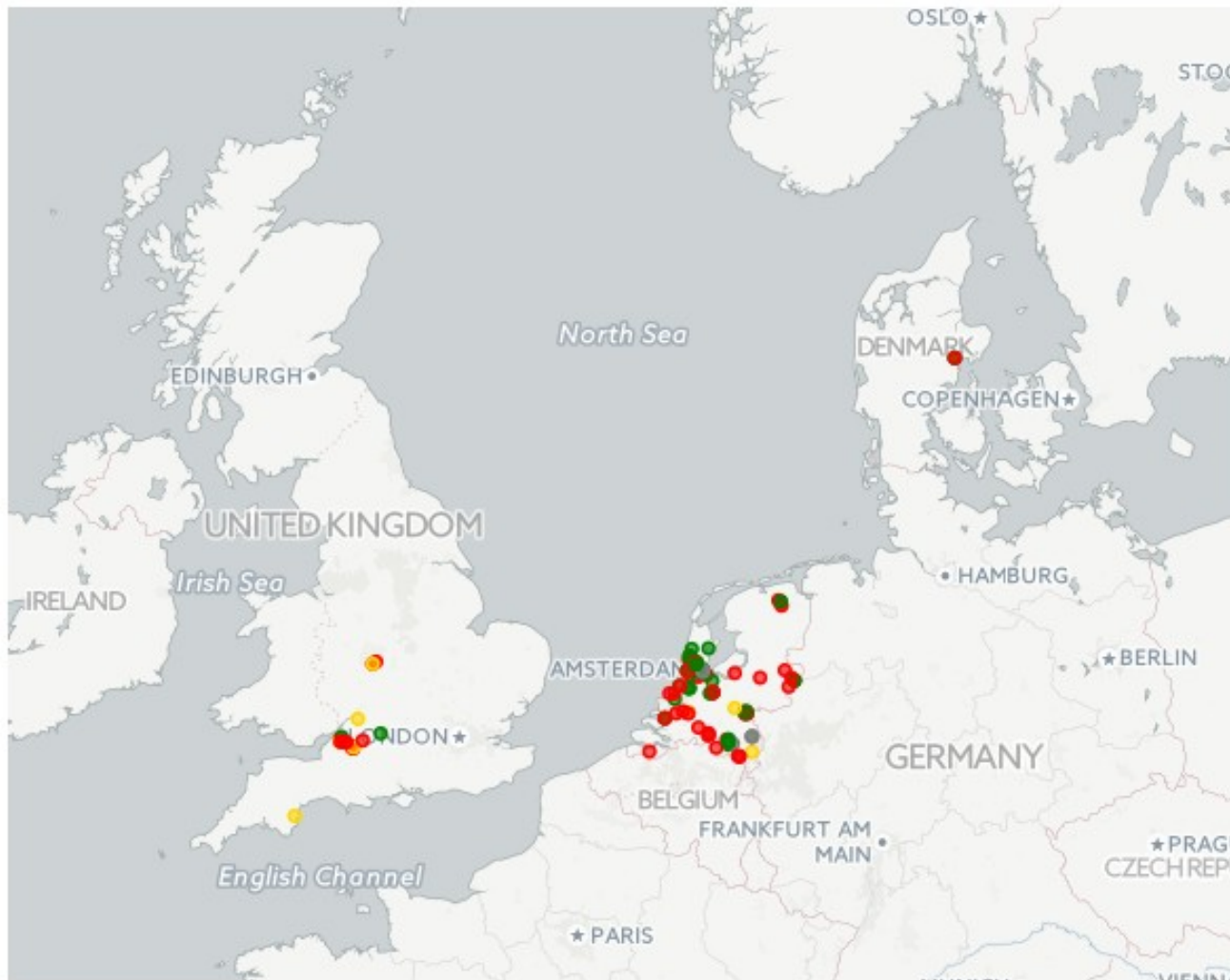
(How) can we do better?

educational detectors + smartphones + global → science!

Examples of CREDO players: HiSPARC



Map of HiSPARC stations



Stations

List by [Location](#) [Name](#)
[Number](#)

Map [Overview](#)

Data [Coincidences](#)

Data availability

[Station](#) ← Link to data
Station No data received

Current status

- Up (51)
- Problem (13)
- Down (62)
- Unknown
- ← Link to status

Region map

[Cluster](#) ← Link to map

Examples of CREDO players: DECO



[HOME](#) [PROJECT](#) [APP](#) **[DATA](#)** [EDUCATION](#) [RESEARCH](#) [FAQ](#) [CONTACT](#)



DATA



Examples of CREDO players: CRAFTIS

[About](#)[Contact](#)[Map](#)[Blog](#)[Paper](#)[Login](#)**Total Exposure** ⓘ

9 years, 42 days, 15 hours

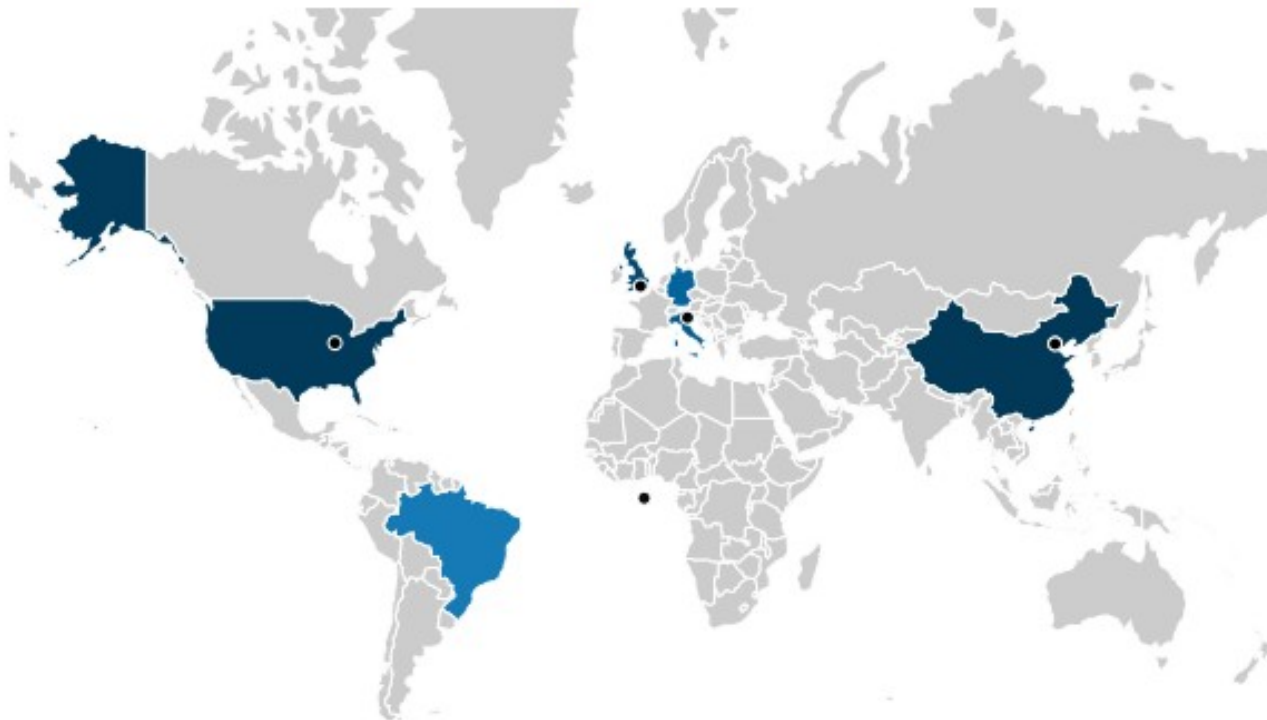
Unique Devices

363

Candidate Hits ⓘ

42,829,394

Network Map ⓘ



National Ranking

Rank	Country	Score ⓘ
1	China	1,527,859
2	United States	1,343,826
3	United Kingdom	607,262
4	Italy	196,628
5	Germany	115,145
6	Brazil	23,611
7	Swaziland	70

Examples of CREDO players: JINR

[Shower of knowledge](#)

[News](#)

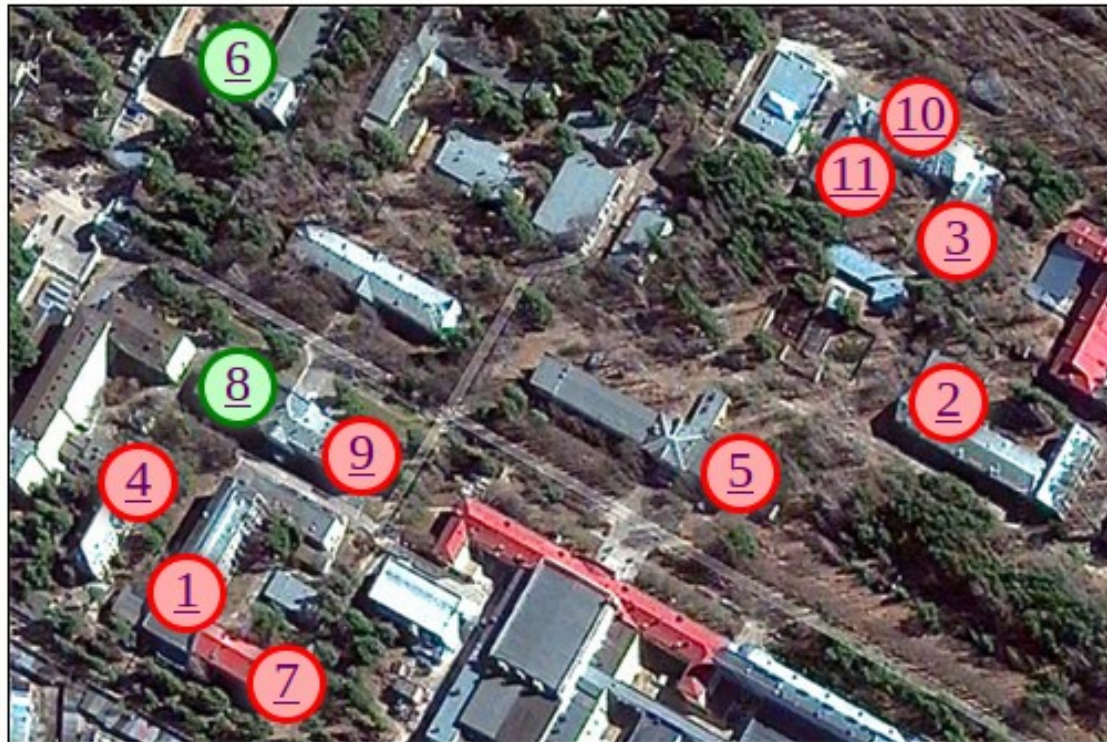
[Project](#)▼

[Setup](#)▼

[Manual](#)

[About site](#)

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Welcome, dear Guest!

We are glad to see you in our laboratory of cosmic rays. We suggest you to start from surfing through the available sections and try to make the simplest analysis of real experimental data, which our station provides continuously. We hope that it will entice you and you will become a permanent and full-fledged member of our international laboratory.

Examples of CREDO players: INP PAS, Krakow

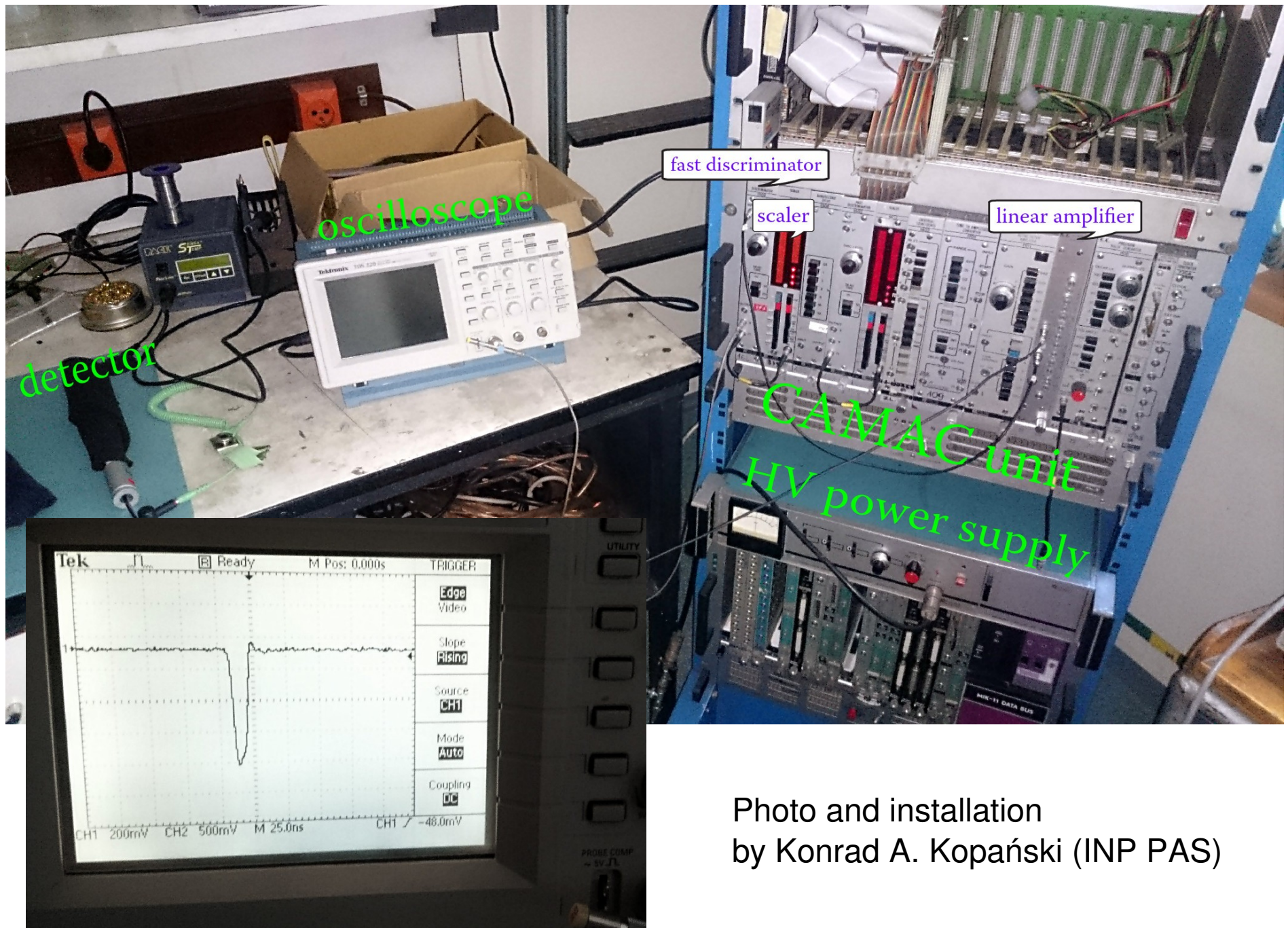
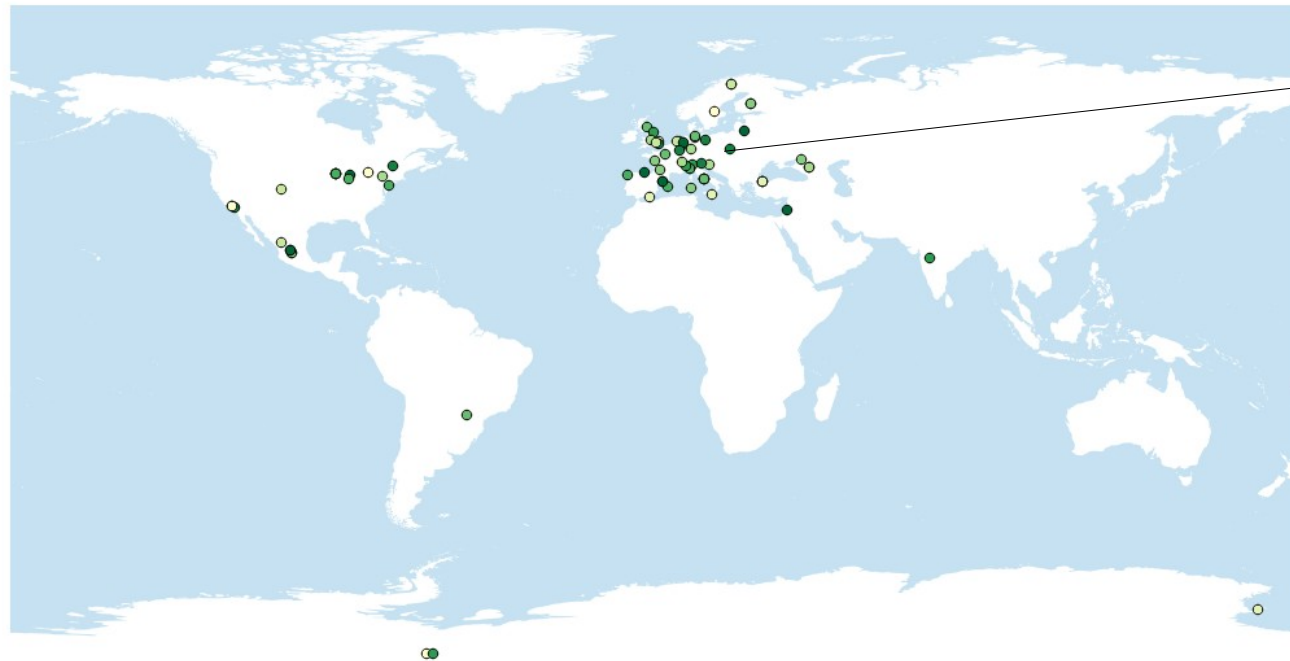
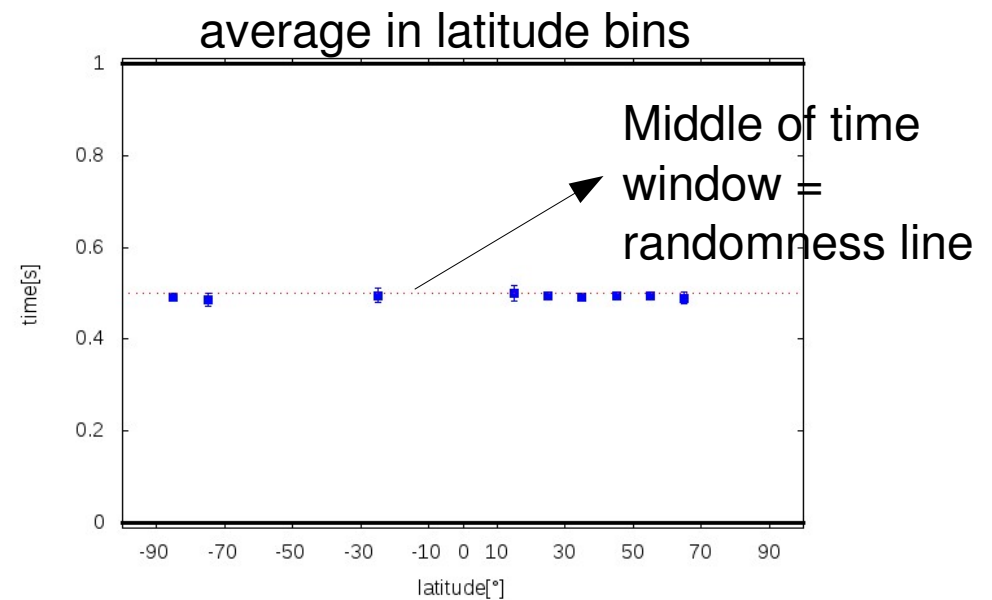
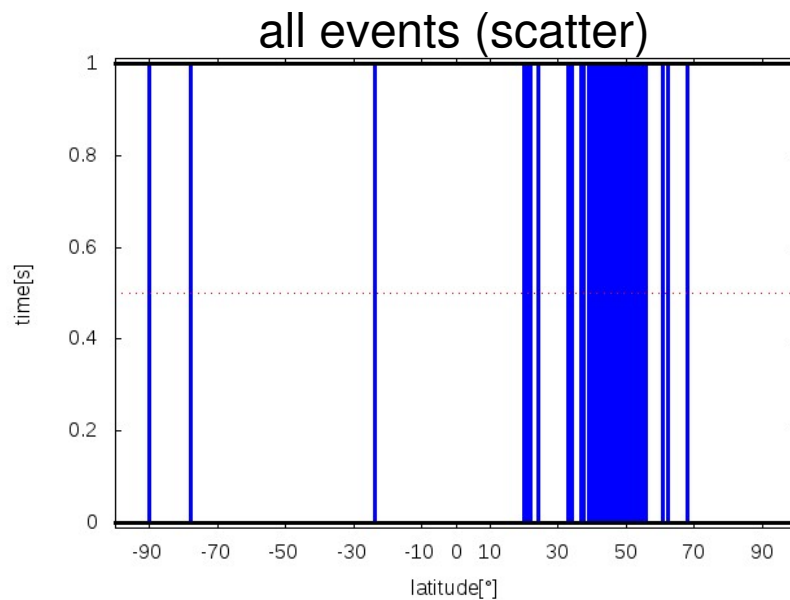


Photo and installation
by Konrad A. Kopański (INP PAS)

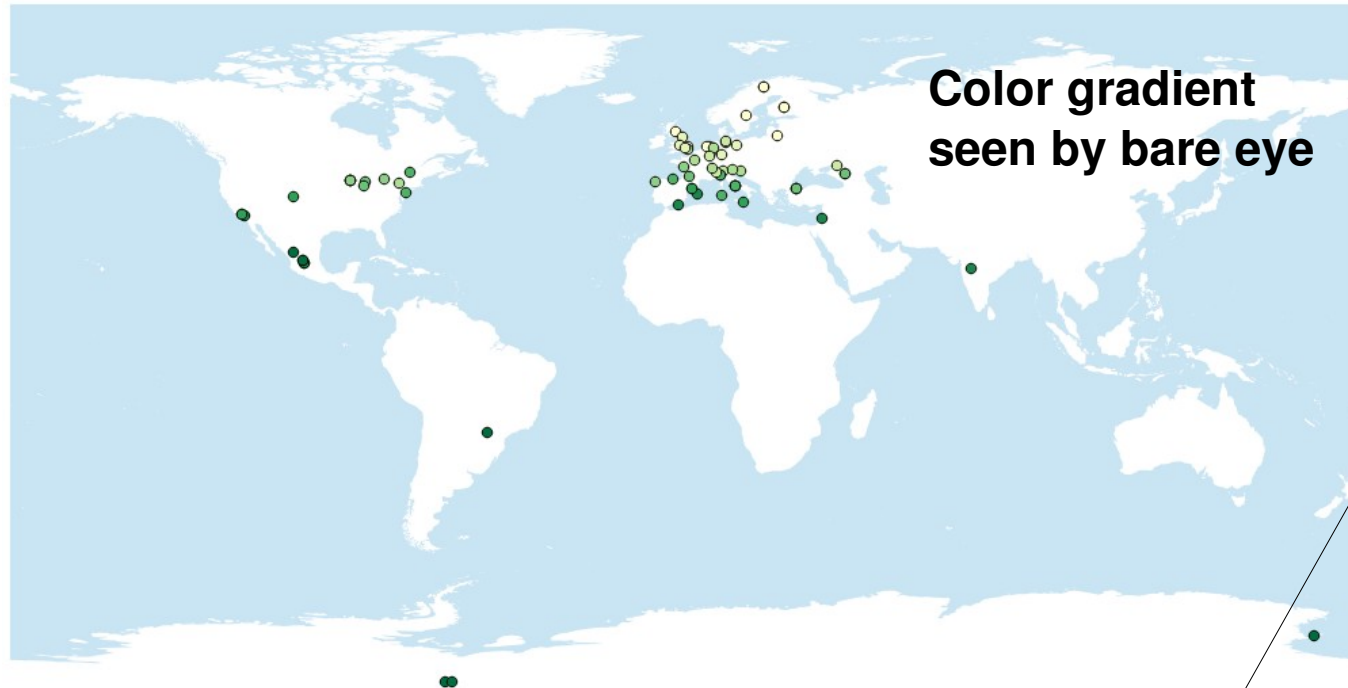
the simplest CREDO analysis: “**NO SIGNAL**” simulation



INP PAS
Kraków
CREDO
station

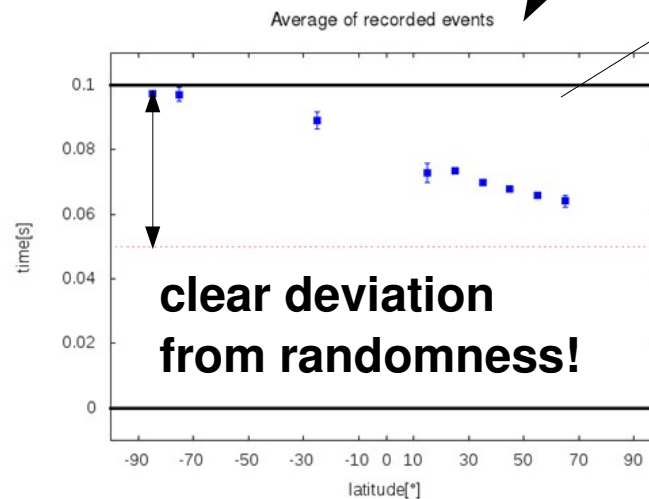
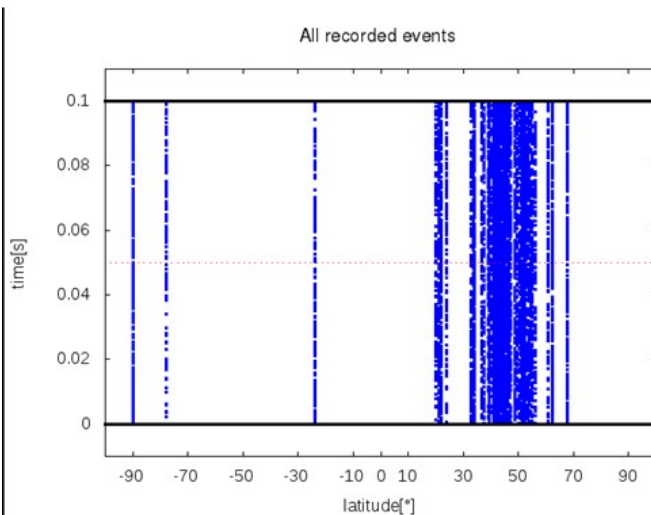


the simplest CREDO analysis: “**SIGNAL**” simulation



alerting
potential

Good candidate
for **unique**
super-preshower
signature



Middle of time
window =
randomness line

Advantages of CREDO:

- addresses the **key unsolved problems in physics** (Dark Matter,...)
- diversified physics potential: fundamental, space weather, geophysics
- social/practical: education/training/outreach/bridges-among-cultures
- **super economic** (mainly existing infrastructure & smartphones)
- „classical” citizen science (strengthen funding applications)
- potential to **support (and be supported by) all the astro-experiments**: (part of) each cosmic/gamma ray observatory can/should be a CREDO station; CREDO provides multichannel info to all **(ALERTS!)**
- **already existing initiative** (interest @: Krakow, Dubna, HiSPARC, Nebraska, Kansas, Sao Paolo, ..., **collaborations**: CRAYFIS, Pierre Auger Observatory, Baikal-GVD)

CREDO: vision



Why don't we use our
water container for a more
humanitarian purpose?
Let's join CREDO!



Cool, we too! Ice-house
can be a CR detector,
And we can work at home!