

S5

DPC 2007-2009

High-resolution multi-disciplinary monitoring of active fault test-site areas in Italy

Project INGV-DPC S5

“Test-sites” per il monitoraggio multidisciplinare di dettaglio”

Task 1 - Test site “Alto-Tiberina”

UR1 WP3

Velocity and strain rate fields from
integration of regional GPS networks

Partecipanti:

Nicola D'Agostino (INGV Roma1) responsabile

Antonio Avallone (INGV, Roma CNT)

Daniele Cheloni (INGV, Roma CNT)

Elisabetta D'Anastasio (INGV, Roma CNT)

Sergio Mantenuto (INGV, Roma CNT)

In collaborazione con UR Perugia

Obiettivi:

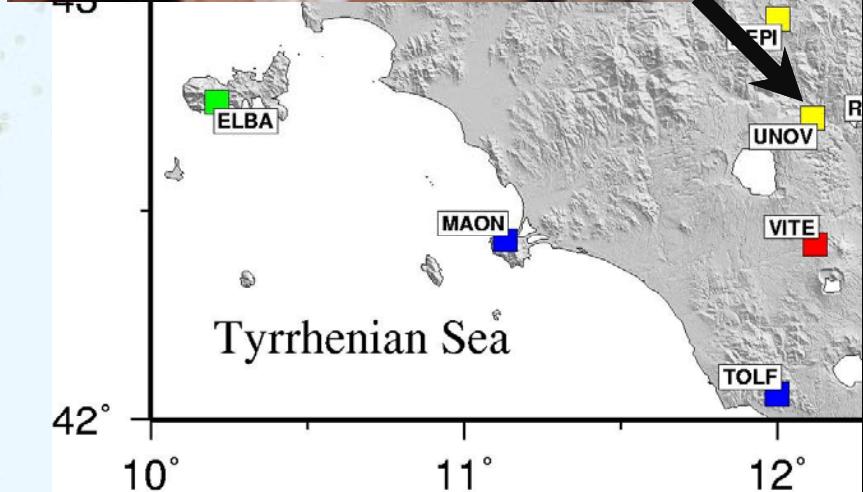
- Combinazione di dati da varie reti GPS
- Definizione del campo di velocità e di strain rate geodetico
- Definizione del campo di deformazione sismico (rilascio momento sismico)
- Confronto tra tassi di rilascio sismico/geodetico
- Tassi di accumulo su strutture sismogenetiche (ATF, Gubbio)

Kick-off meeting - Rome, 4 July 2008

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High-resolution multi-disciplinary research

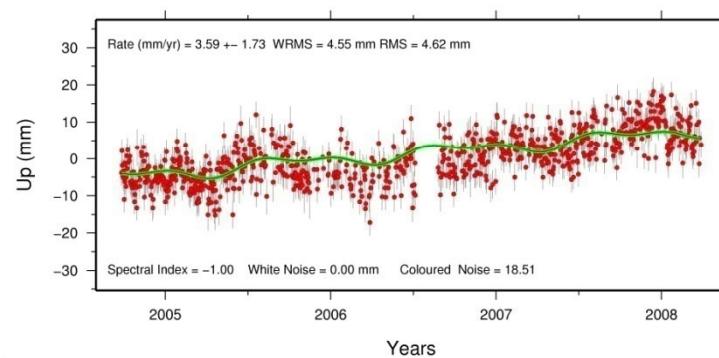
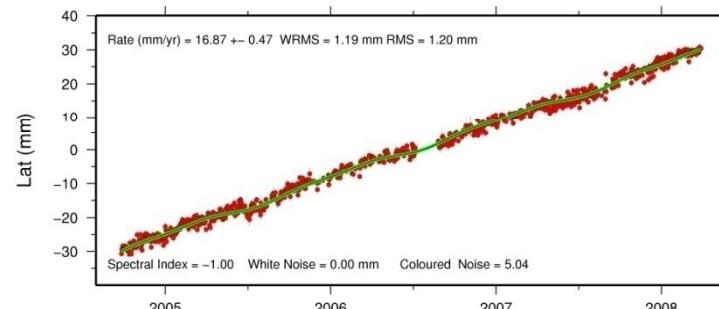
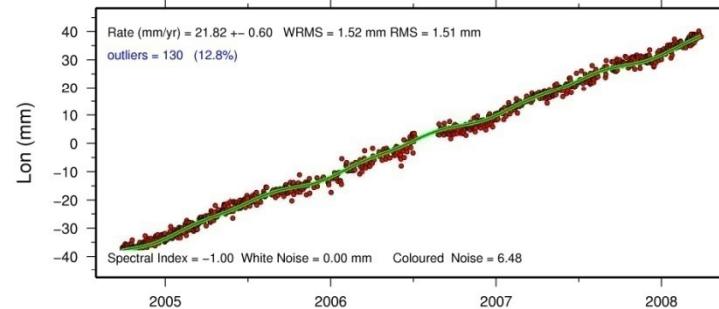


/raid/proc/time_series/zapnet/itrf05

UNOV
(err_model: flicker)

Time Span = 3.51 yrs; N= 873 ; clean/

XYZ (m) = 4589198.0367 984938.7078 4304620.4024



GMD 2008 Apr 23 15:08:26

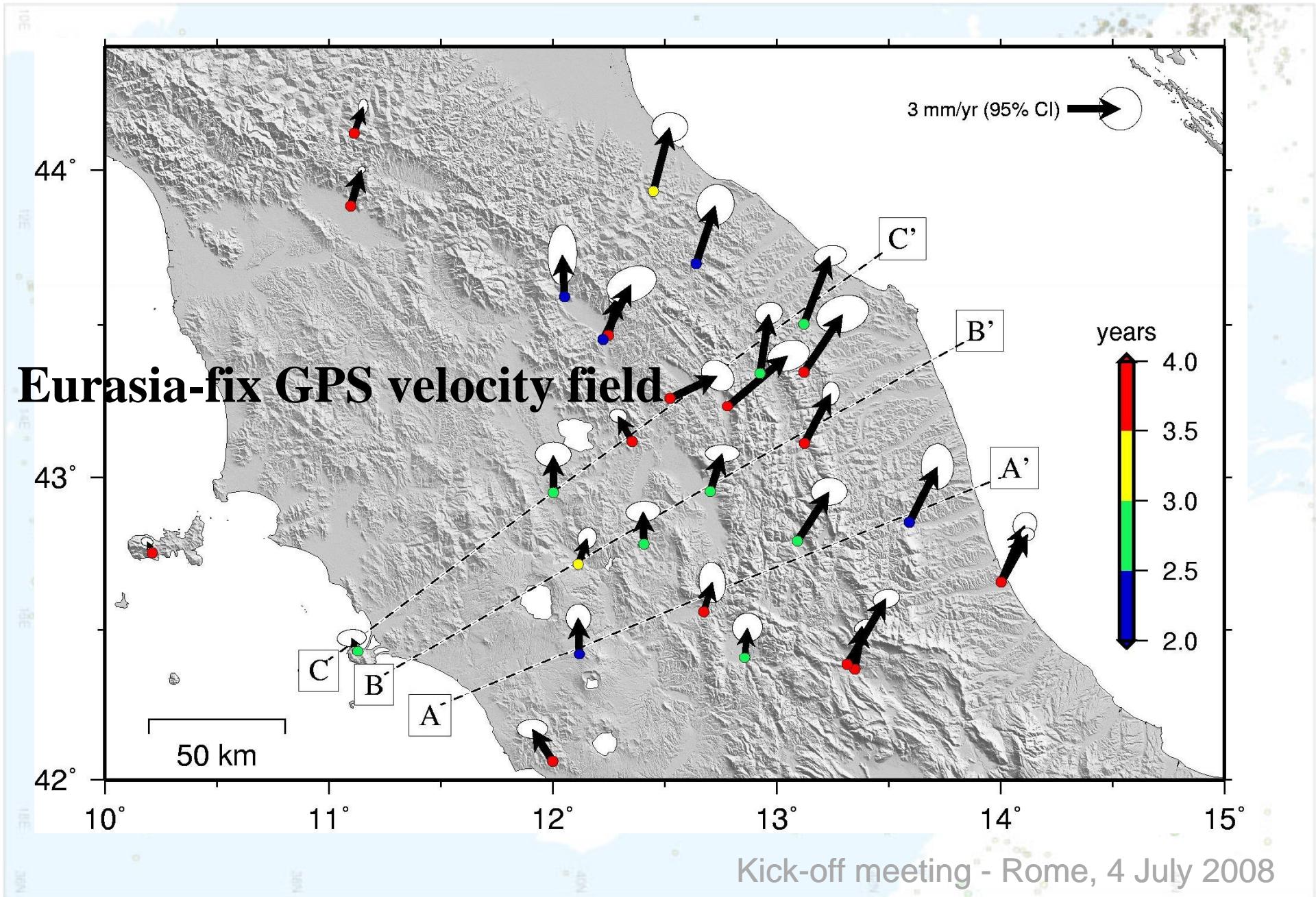
12.1131 42.7159 21.82 16.87 0.60 0.47 0.123 UNOV 3.51 873

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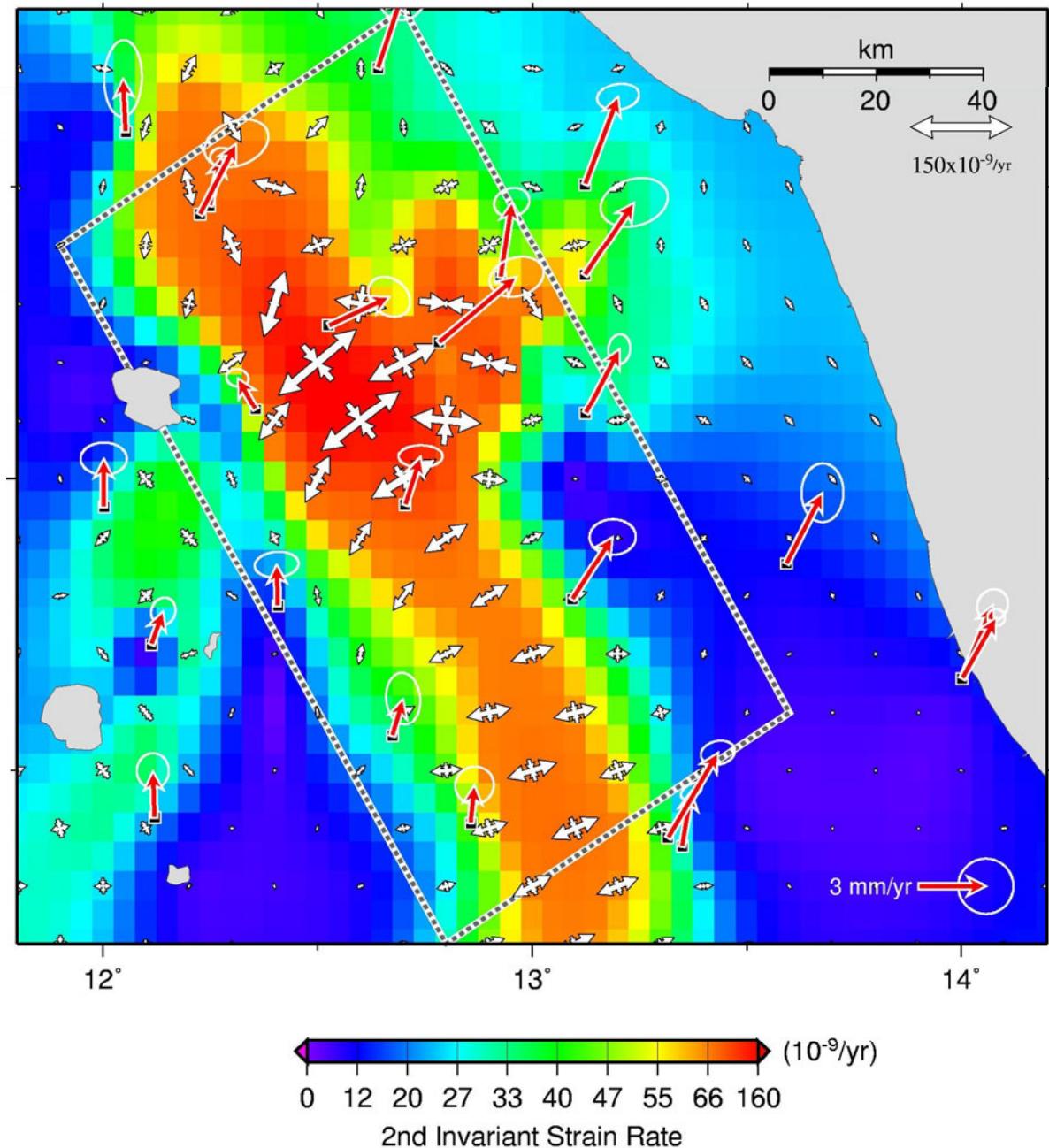
Geodetic strain

- Continuous velocity field obtained by spline interpolation of GPS velocity field
- Strain rate tensor obtained from the velocity gradient tensor
- Geodetic moment rate obtained from Kostrov formula

$$\dot{M}_0 = \sum 2\mu A H \dot{\varepsilon}$$

Min	$2.46 \times 10^{17} \text{ Nm/yr}$
Max	$4.31 \times 10^{17} \text{ Nm/yr}$

H = seismogenic thickness 7.5/12.5 km
 $\mu = 3.3 \times 10^{10} \text{ N/m}^2$



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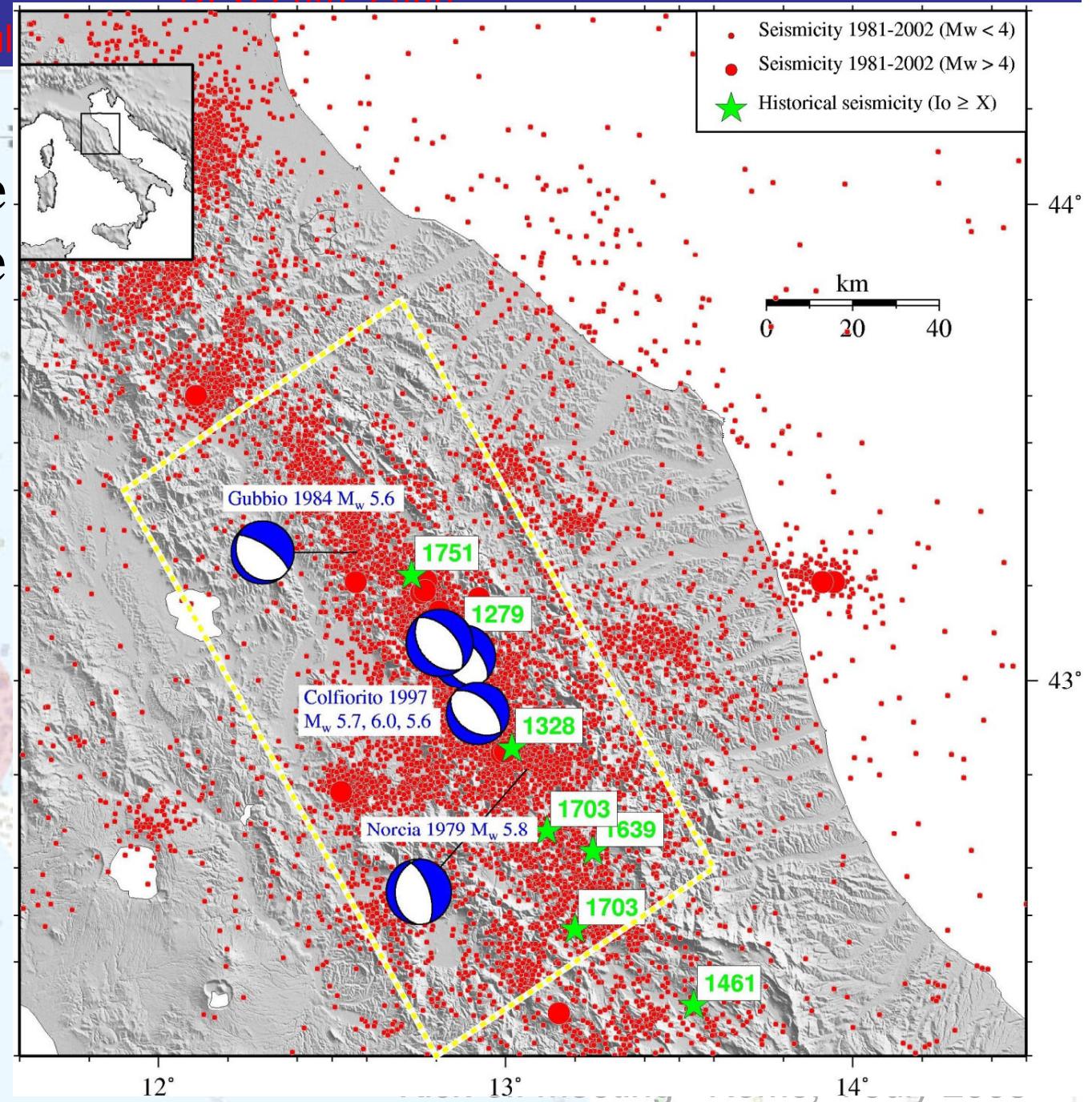
Seismicity of the Umbria-Marche region

Red dots =>
1981-2002 instrumental seismicity
CSI 1.1 (<http://legacy.ingv.it/CSI/>)

Green stars =>
historical $I_0 > X$ (CPTI04)

CMT focal solutions

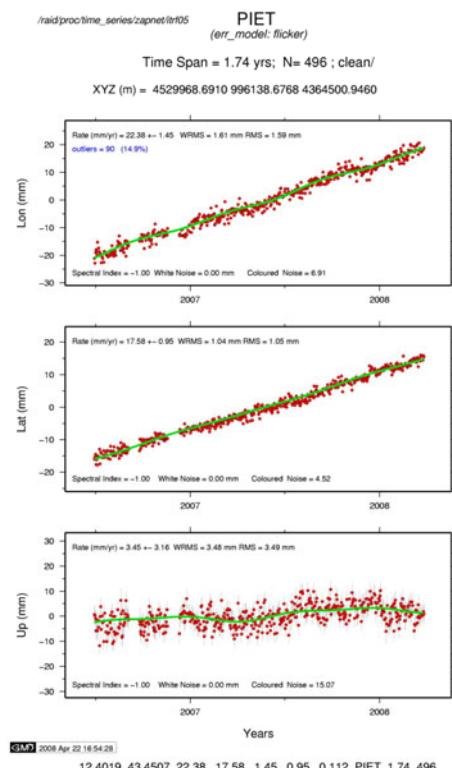
Yellow box used for calculation
of seismic and geodetic
moment rate



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Rete GPS ATF

Perugia



Alto Tiberina Valley

Google™

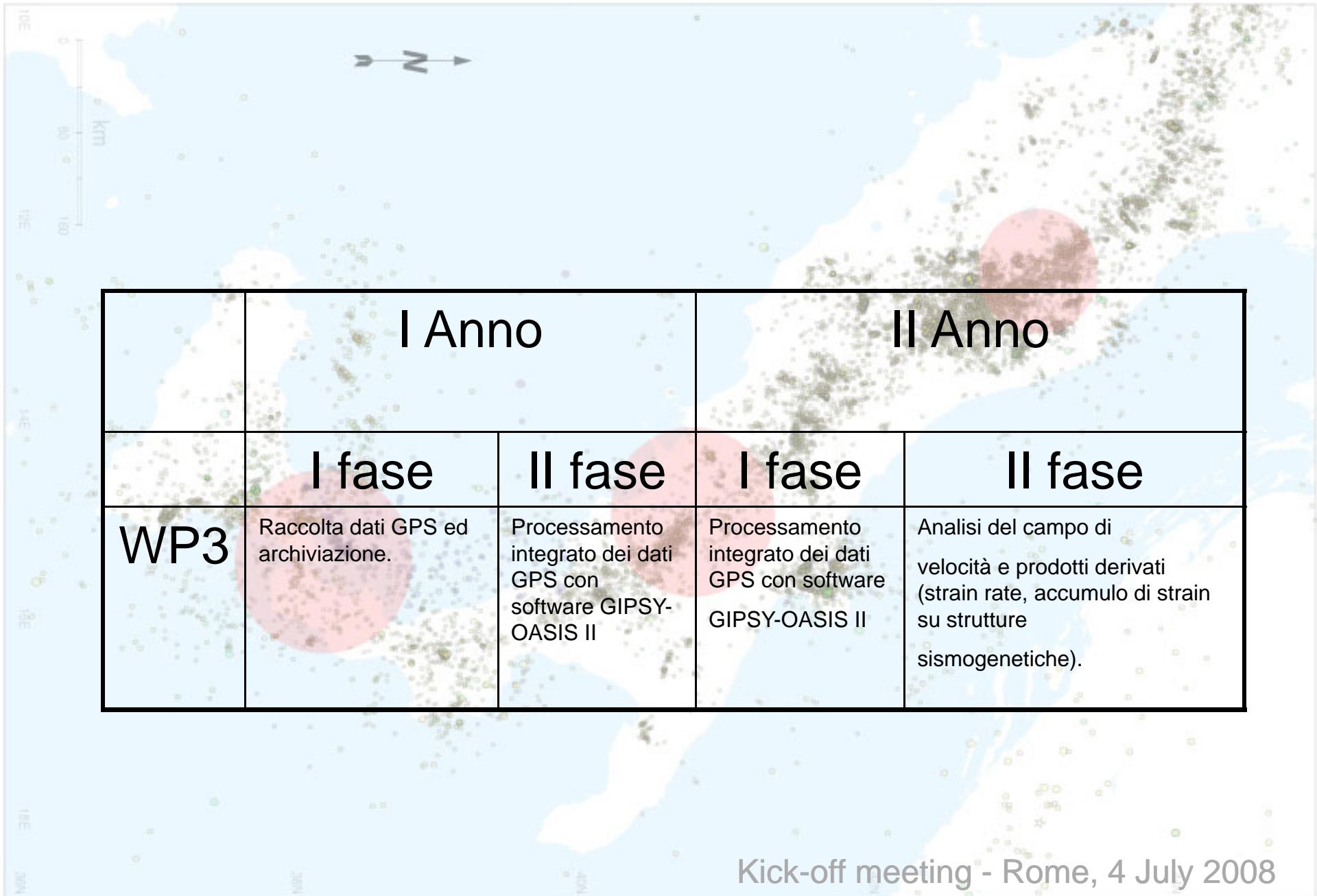
Stazione Pietralunga

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A map of Italy with numerous small yellow dots representing GPS stations. A larger red shaded area highlights the central Apennine region, specifically the Molise, Abruzzo, and Marche provinces. A scale bar indicates distances from 0 to 100 km, and a north arrow is present. The map also shows latitude lines from 38°N to 42°N and longitude lines from 12°E to 16°E.

	I Anno		II Anno	
	I fase	II fase	I fase	II fase
WP3	Raccolta dati GPS ed archiviazione.	Processamento integrato dei dati GPS con software GIPSY-OASIS II	Processamento integrato dei dati GPS con software GIPSY-OASIS II	Analisi del campo di velocità e prodotti derivati (strain rate, accumulo di strain su strutture sismogenetiche).

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