

# Analyse du séisme de Mw 4.8 de La Laigne du 16 juin 2023 16h38 UTC

## Charente-Maritime (17) – Deux-Sèvres (79)

- Inversion de la localisation hypocentrale et estimation de l'incertitude
- Mécanisme au foyer à partir de la polarité de l'onde P
- Inversion des formes d'ondes FMNEAR



Observatoire  
de la CÔTE d'AZUR

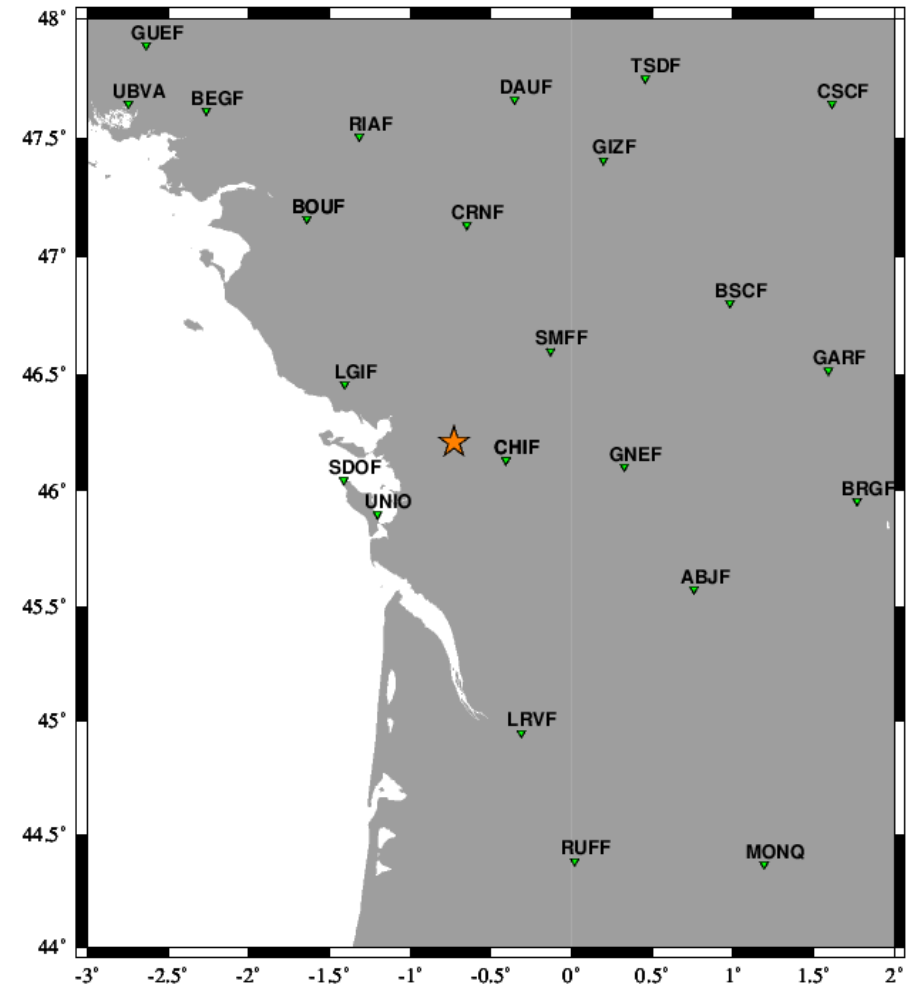
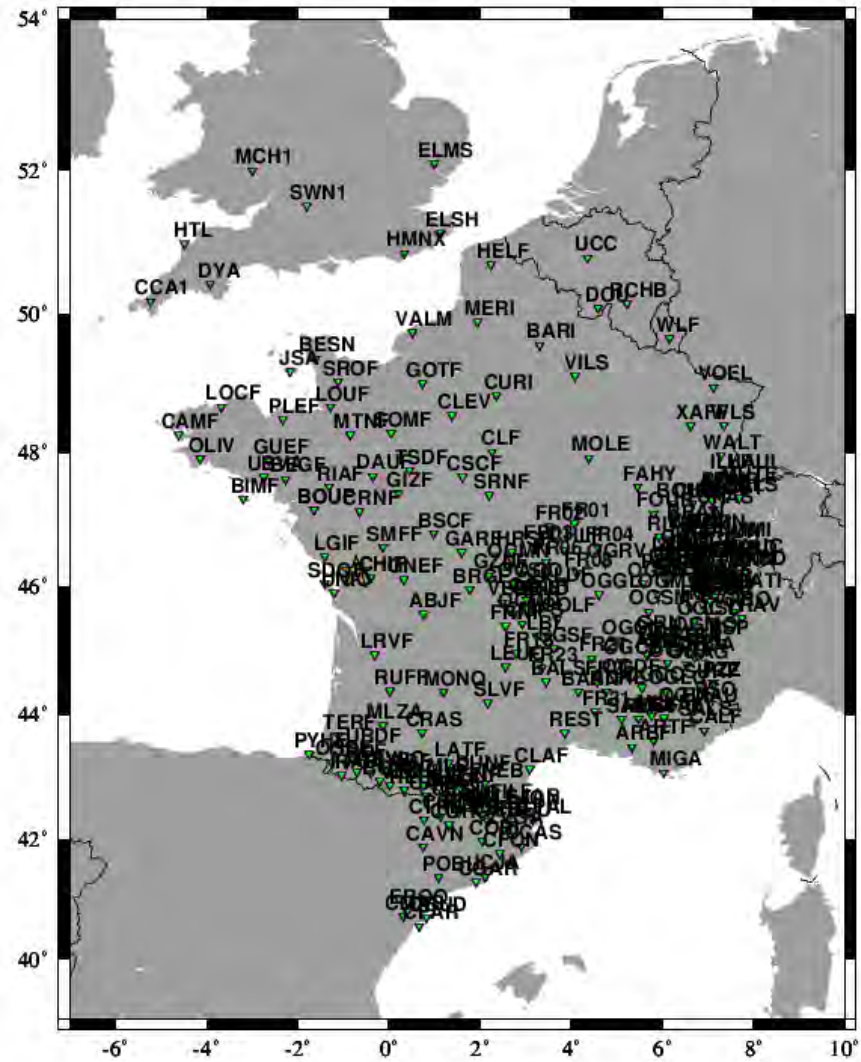


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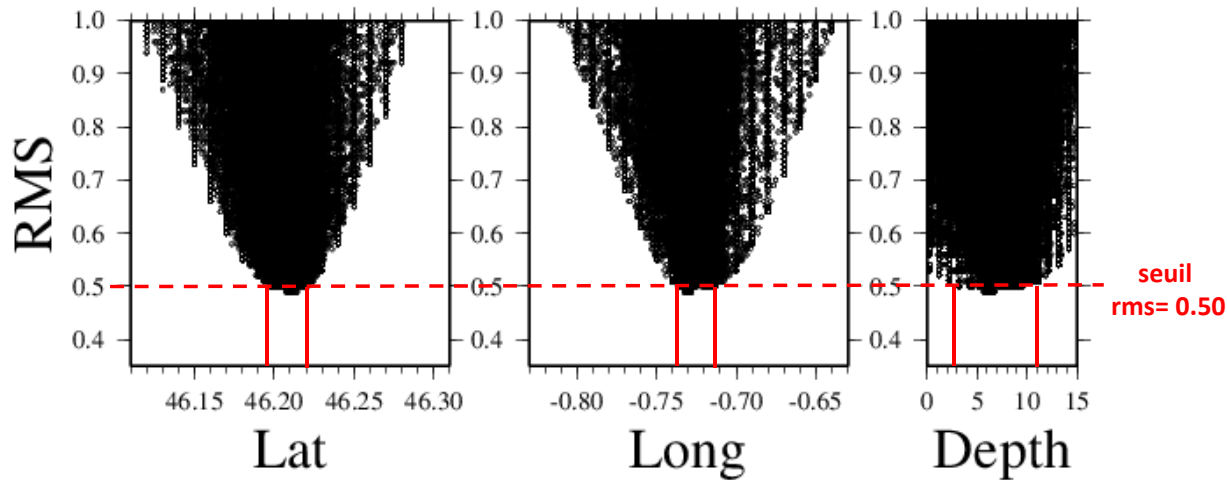


EPOS-FR  
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# Stations récupérées



★ : épicentre moyen



## Localisation par inversion des temps d'arrivée P et S

Méthode GRIDSIMLOC\*

(Localisation absolue non linéaire avec prise en compte d'une grande variété de modèles de vitesse)

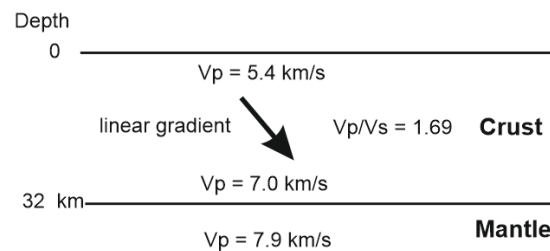
### Estimation des incertitudes:

- Latitude entre 46.195 et 46.22 → +/- 3 km en latitude
- Longitude entre -0.737 et -0.711 → +/- 2 km en longitude
- Profondeur entre 3 et 11 km → +/- 4 km en profondeur**

**Hypocentre moyen : lat 46.210 long -0.728 prof 7 km**

(moyenne pondérée par la rms)

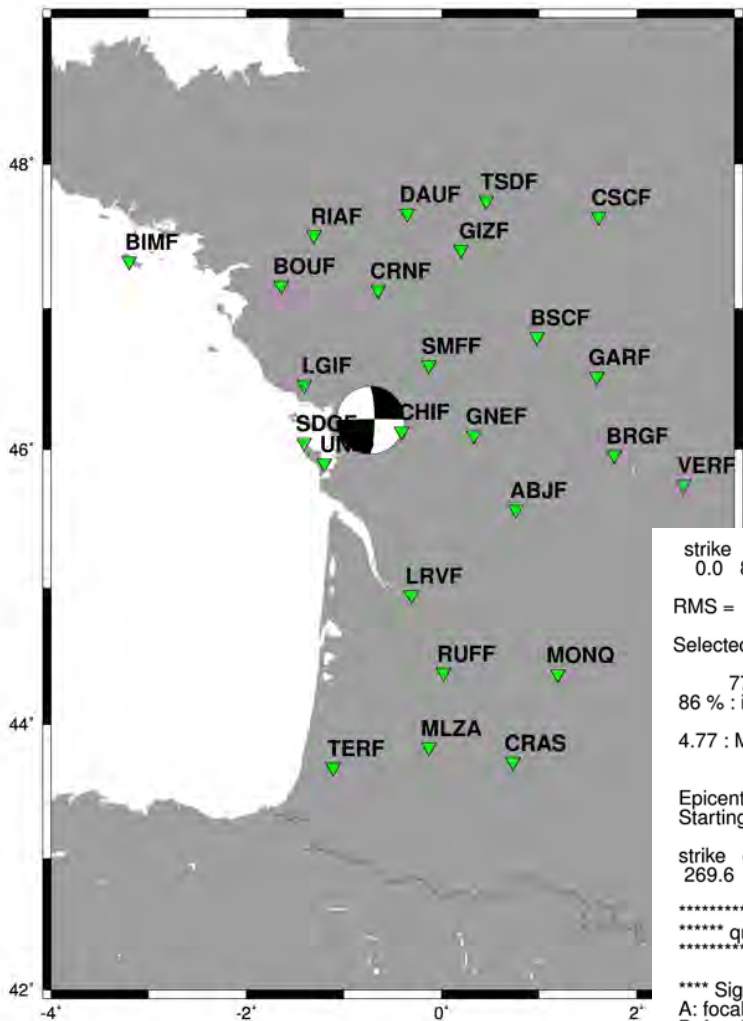
### Meilleur modèle de vitesse optimal :



\* Delouis B., Oral E., Menager M., Ampuero J.-P., Guilhem Trilla A., Régner M. & Deschamps A., 2021. Constraining the point source parameters of the 11 November 2019 Mw 4.9 Le Teil earthquake using multiple relocation approaches, first motion and full waveform inversions, *Comptes Rendus Géoscience* 353(S1):1-24.  
DOI : <https://doi.org/10.5802/crgeos.78>



# Inversion des formes d'ondes FMNEAR



strike dip rake  
0.0 80.0 2.3 : best focal mechanism

RMS = 0.456

Selected depth: 5.0 km

77 = number of components with freqband > 0.015Hz  
86 % : index of confidence

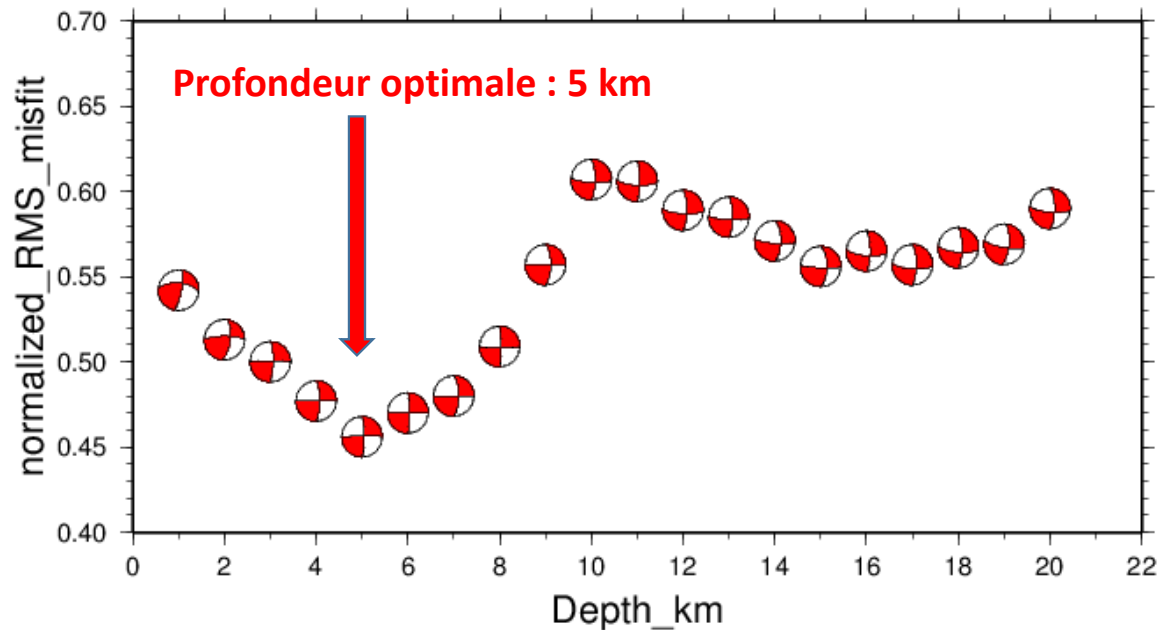
4.77 : Mw from waveform inversion

Epicenter used (lat,long): 46.210 -0.728  
Starting depth(km): 5.0

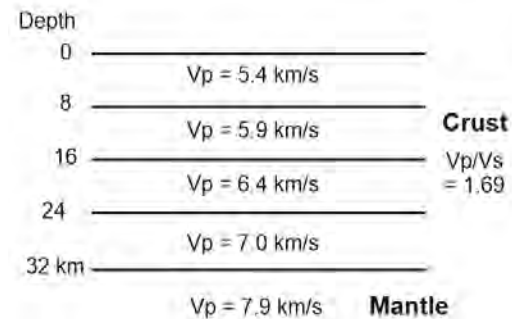
strike dip rake of the second nodal plane:  
269.6 87.8 170.0

\*\*\*\*\*  
\*\*\*\*\* quality: A \*\*\*\*\*  
\*\*\*\*\*

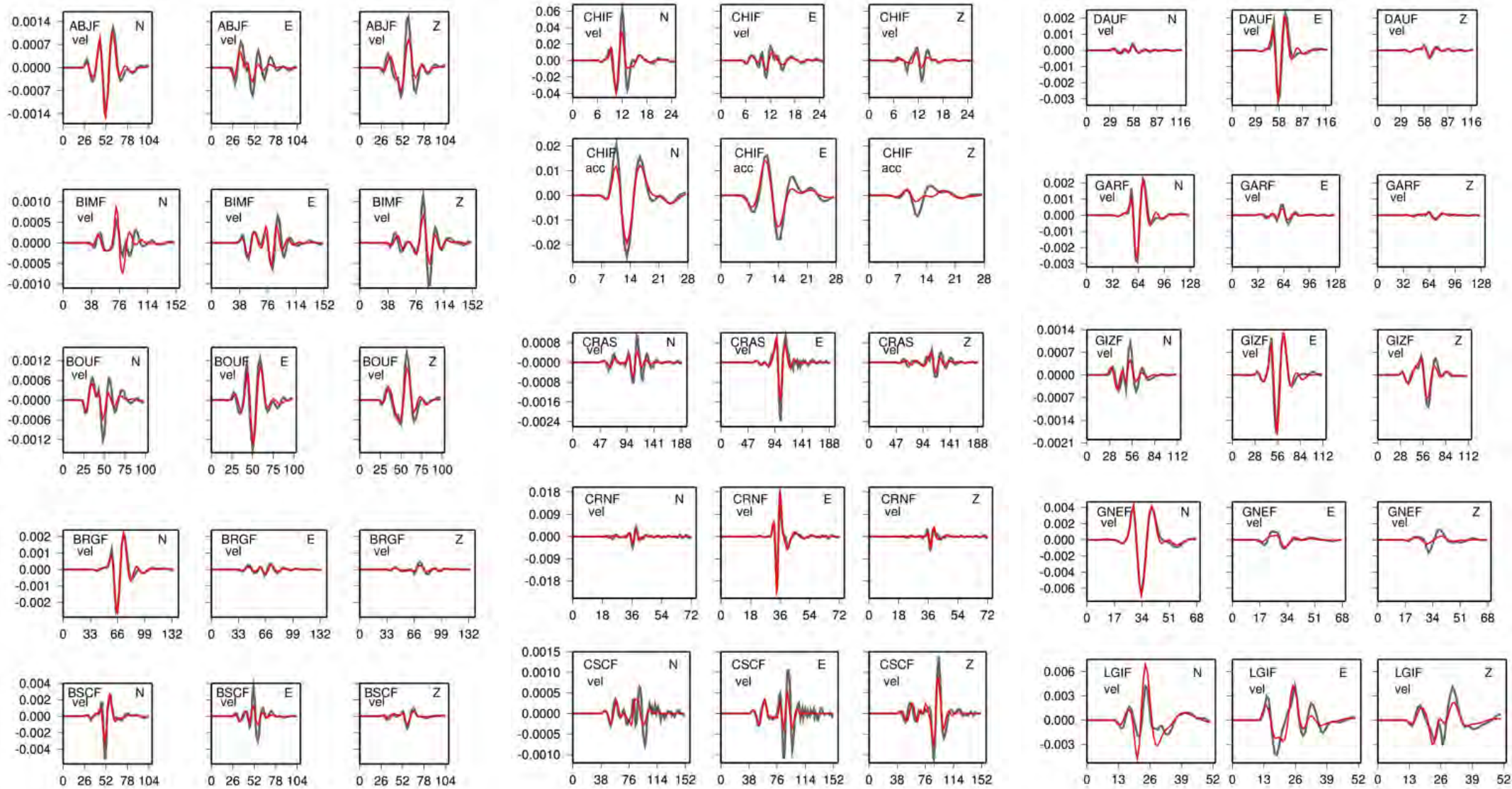
\*\*\*\* Signification of quality \*\*\*\*  
A: focal mechanism STRONGLY CONSTRAINED  
B: focal mechanism WELL CONSTRAINED  
C: focal mechanism MODERATELY CONSTRAINED  
D: focal mechanism WEAKLY CONSTRAINED  
E: focal mechanism BARELY CONSTRAINED  
F: focal mechanism NOT CONSTRAINED  
\*\*\*\*\*



## Modèle de vitesse

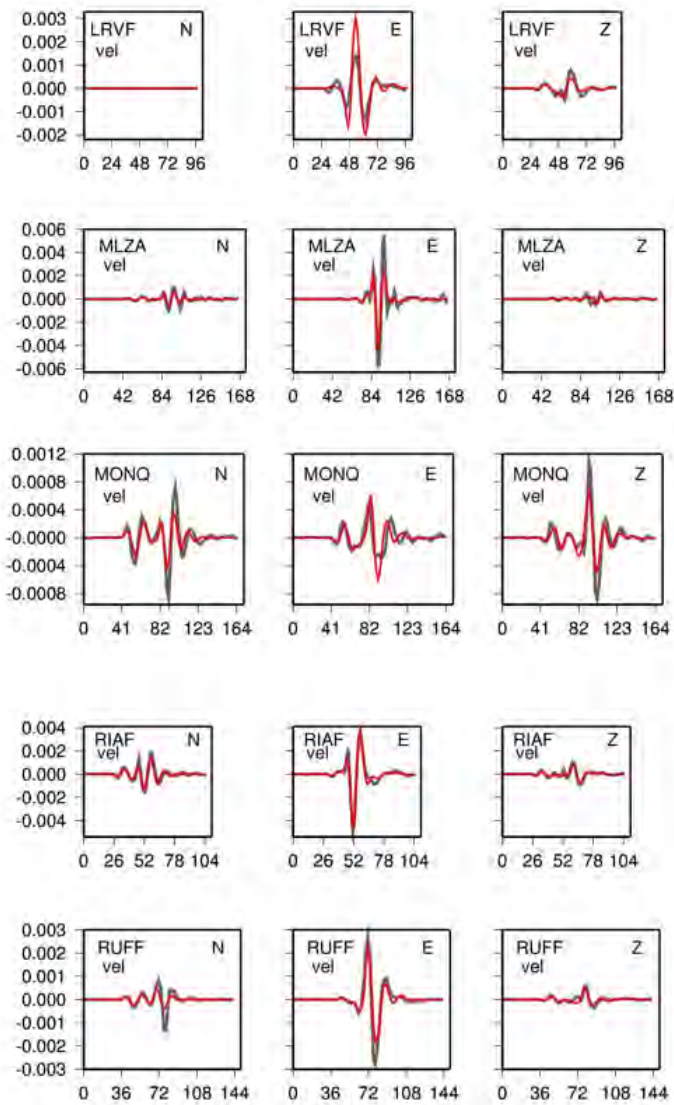




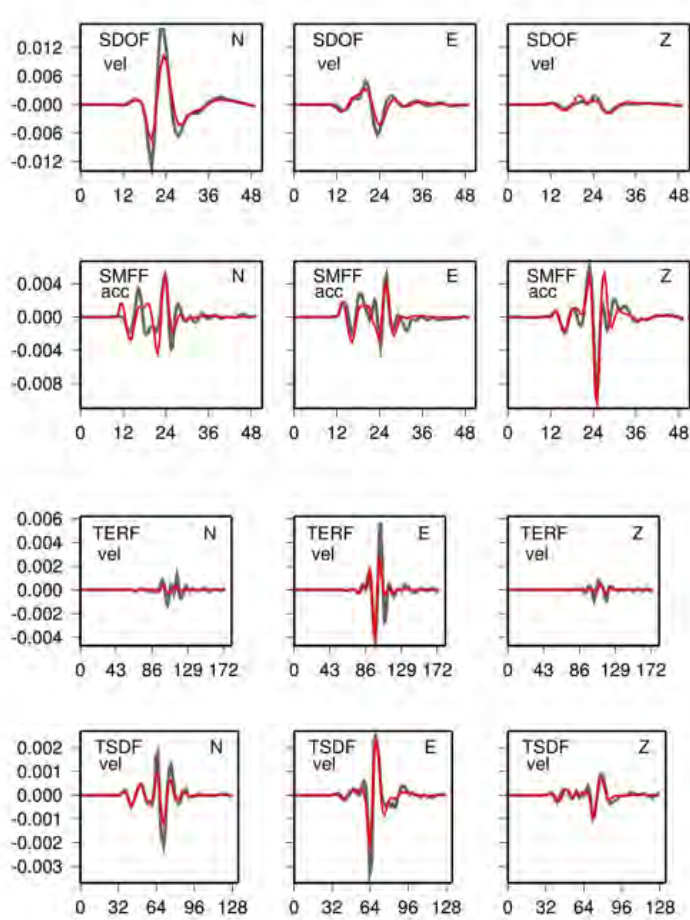


Amplitudes in cm Time in s

— : Obs  
 — : model



Amplitudes in cm Time in s



— : Obs  
— : model

ABJF N vel	0.0200 Hz to 0.0700 Hz	MLZA N vel	0.0300 Hz to 0.1000 Hz
ABJF E vel	0.0200 Hz to 0.0700 Hz	MLZA E vel	0.0300 Hz to 0.1000 Hz
ABJF Z vel	0.0200 Hz to 0.0700 Hz	MLZA Z vel	0.0300 Hz to 0.1000 Hz
BIMF N vel	0.0200 Hz to 0.0700 Hz	MONQ N vel	0.0200 Hz to 0.0700 Hz
BIMF E vel	0.0200 Hz to 0.0700 Hz	MONQ E vel	0.0200 Hz to 0.0700 Hz
BIMF Z vel	0.0200 Hz to 0.0700 Hz	MONQ Z vel	0.0200 Hz to 0.0700 Hz
BOUF N vel	0.0200 Hz to 0.0700 Hz	RIAF N vel	0.0300 Hz to 0.1000 Hz
BOUF E vel	0.0200 Hz to 0.0700 Hz	RIAF E vel	0.0300 Hz to 0.1000 Hz
BOUF Z vel	0.0200 Hz to 0.0700 Hz	RIAF Z vel	0.0300 Hz to 0.1000 Hz
BRGF N vel	0.0200 Hz to 0.0700 Hz	RUFF N vel	0.0200 Hz to 0.0700 Hz
BRGF E vel	0.0200 Hz to 0.0700 Hz	RUFF E vel	0.0200 Hz to 0.0700 Hz
BRGF Z vel	0.0200 Hz to 0.0700 Hz	RUFF Z vel	0.0200 Hz to 0.0700 Hz
BSCF N vel	0.0300 Hz to 0.1000 Hz	SDOF N vel	0.0400 Hz to 0.1500 Hz
BSCF E vel	0.0300 Hz to 0.1000 Hz	SDOF E vel	0.0400 Hz to 0.1500 Hz
BSCF Z vel	0.0300 Hz to 0.1000 Hz	SDOF Z vel	0.0400 Hz to 0.1500 Hz
CHIF N vel	0.2000 Hz to 0.5000 Hz	SMFF N acc	0.0800 Hz to 0.3000 Hz
CHIF E vel	0.2000 Hz to 0.5000 Hz	SMFF E acc	0.0800 Hz to 0.3000 Hz
CHIF Z vel	0.2000 Hz to 0.5000 Hz	SMFF Z acc	0.0800 Hz to 0.3000 Hz
CHIF N acc	0.0700 Hz to 0.2000 Hz	TERF N vel	0.0300 Hz to 0.1000 Hz
CHIF E acc	0.0700 Hz to 0.2000 Hz	TERF E vel	0.0300 Hz to 0.1000 Hz
CHIF Z acc	0.0700 Hz to 0.2000 Hz	TERF Z vel	0.0300 Hz to 0.1000 Hz
CRAS N vel	0.0200 Hz to 0.0700 Hz	TSDF N vel	0.0300 Hz to 0.1000 Hz
CRAS E vel	0.0200 Hz to 0.0700 Hz	TSDF E vel	0.0300 Hz to 0.1000 Hz
CRAS Z vel	0.0200 Hz to 0.0700 Hz	TSDF Z vel	0.0300 Hz to 0.1000 Hz
CSCF N vel	0.0300 Hz to 0.1000 Hz	UNIO N acc	0.2000 Hz to 0.5000 Hz
CSCF E vel	0.0300 Hz to 0.1000 Hz	UNIO E acc	0.0700 Hz to 0.2000 Hz
CSCF Z vel	0.0300 Hz to 0.1000 Hz	UNIO Z acc	0.2000 Hz to 0.5000 Hz
DAUF N vel	0.0200 Hz to 0.0700 Hz	VERF N vel	0.0200 Hz to 0.0700 Hz
DAUF E vel	0.0200 Hz to 0.0700 Hz	VERF E vel	0.0200 Hz to 0.0700 Hz
DAUF Z vel	0.0200 Hz to 0.0700 Hz	VERF Z vel	0.0200 Hz to 0.0700 Hz
GARF N vel	0.0200 Hz to 0.0700 Hz		
GARF E vel	0.0200 Hz to 0.0700 Hz		
GARF Z vel	0.0200 Hz to 0.0700 Hz		
GIZF N vel	0.0200 Hz to 0.0700 Hz		
GIZF E vel	0.0200 Hz to 0.0700 Hz		
GIZF Z vel	0.0200 Hz to 0.0700 Hz		
GNEF N vel	0.0300 Hz to 0.1000 Hz		
GNEF E vel	0.0300 Hz to 0.1000 Hz		
GNEF Z vel	0.0300 Hz to 0.1000 Hz		
LGIF N vel	0.0400 Hz to 0.1500 Hz		
LGIF E vel	0.0400 Hz to 0.1500 Hz		
LGIF Z vel	0.0400 Hz to 0.1500 Hz		
LRVF E vel	0.0200 Hz to 0.0700 Hz		
LRVF Z vel	0.0200 Hz to 0.0700 Hz		

## Filterage

# Conclusions

## Profondeur hypocentrale :

- Par inversion des temps  $T_p$  et  $T_s$  : profondeur moyennement contrainte, entre 3 et 11 km (pas de stations très proches)
- Par inversion des formes d'ondes FMNEAR : profondeur bien contrainte 5 +/- 2 km,

**Profondeur préférentielle commune aux deux approches : 5 +/- 2 km**

## Mécanisme au foyer:

Avec les polarités : mécanisme très bien contraint.

FMNEAR : mécanisme stable et très bien contraint, identique (à quelques degrés près) à celui obtenu avec les polarités

**Mécanisme très bien contraint et identique par les deux approches (décrochement à peu près pur)**

**Mw : 4.8 (par FMNEAR)**