

*Geochemistry, Geophysics, Geosystems*

Supporting Information for

**Coseismic rupture model and tectonic implications of January 7, 2022, Menyuan Mw 6.6 earthquake constraints from InSAR observation and field investigation**

Yongsheng Li1,2, Wenliang Jiang1,4,Yujiang Li1\*, Wenhao Shen1, Zhongtai He1, Bingquan Li3, Qiang Li1,4, Qisong Jiao1,4, Yunfeng Tian1,4

1 National Institute of Natural Hazards, Ministry of Emergency Management of China, Beijing 100085, China

2 Key Laboratory of Landslide Risk Early-Warning and Control, MEMC, Chengdu 610059, China

3 School of Automation, China University of Geoscience, Wuhan, 430074, China

4 Key Laboratory of Emergency Satellite Engineering and Application，Ministry of Emergency Management, Beijing,100124, China

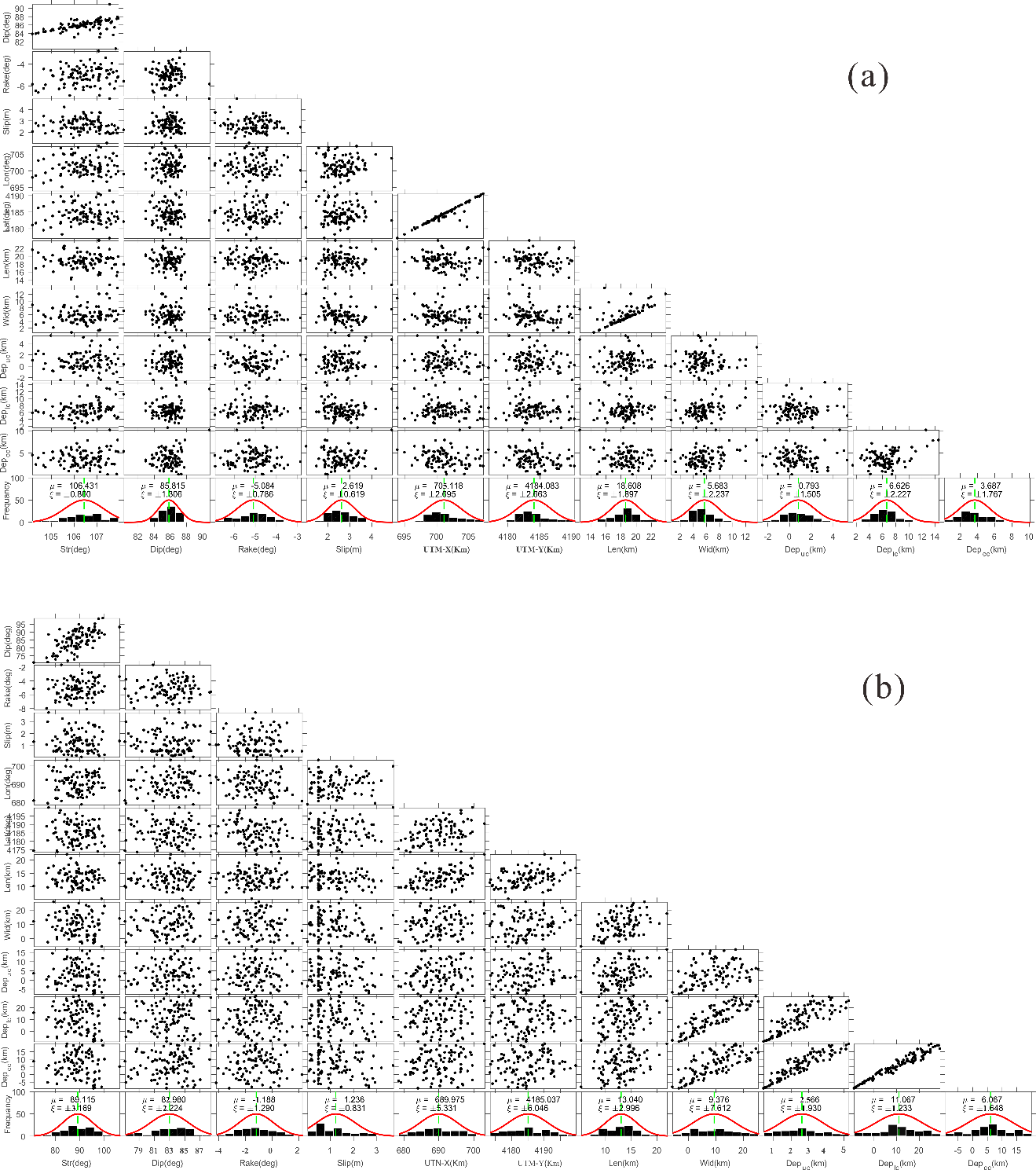
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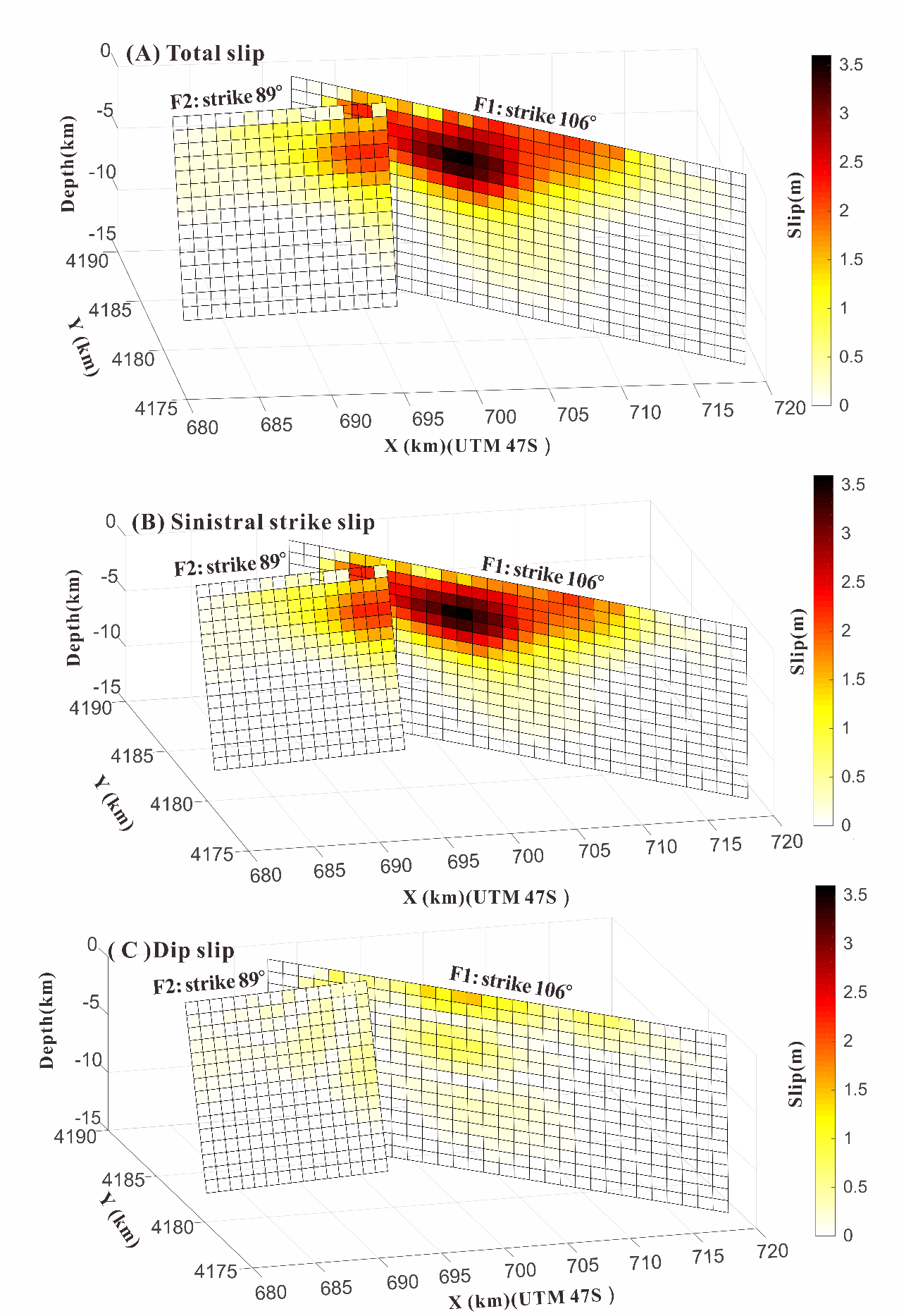
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**Introduction**

In the supporting information, we present the uncertainties and trade-offs for the nonlinear inversion computed using Monte Carlo analysis (Fig. S1), and the perspective view of the rupture faults and spatial distributions of the fault slips in total, strike and dip slips (Fig. S2). The Tab. S1 present the focal mechanisms and rupture parameters from different studies, Tab. S2 shows the Sentinel-1 TOPS mode data used in this paper and Tab. S3 shows the parameters in the stratified viscoelastic Burgers model in this paper.

**Figure S1.** Uncertainties and trade-offs for the nonlinear inversion computed using Monte Carlo analysis. (a) the Monte Carlo analysis for F1. (b) Monte Carlo analysis for F2



**Figure S2.** Perspective view of the rupture faults and spatial distributions of the fault slips.

Table S1. Focal mechanisms and rupture parameters from different studies.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **Lon** | **Lat** | **Focal mechanism** | **Depth(km)** | **Mag. (**Mw**)** |
| IPGP | 101.275°E | 37.811°N | 284°/89°/-2° | 15.0 | 6.68 |
| USGS | 101.278°E | 37.815°N | 104°/88°/15° | 11.5 | 6.61 |
| GCMT | 101.31°E | 37.80°N | 104°/82°/1° | 14.8 | 6.7 |
| GFZ | [101.34°E](https://geohack.toolforge.org/geohack.php?language=en&params=37.81;101.34_type:country&pagename=GEOFON&title=GEOFON%20Event%20gfz2022amie) | 37.81°N | 285°/82°/16° | 10.0 | 6.6 |
| IG, CEA | 101.26°E | 37.77°N | 109°/81°/39° | 4.0 | 6.6 |
| Li et al., 2022 | - | - | F1: 104°/80°/0°  F2: 109°/80°/5° | 5.0 | 6.7 |
| InSAR (This study) | 101.28°E | 37.812°N | F1: 106°/86°/-5°  F2: 89°/83°/-1° | 4.0 | 6.6 |

**Table S2.** SAR images used in the InSAR analysis

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Track** | **Direction** | **Master** | **Slave** | **Spat. baseline** | | **Inc. angle** | |
| 26 | ASC | 20211229 | 20220110 | | 107 | | 45 | |
| 33 | DSC | 20211229 | 20220110 | | 55 | | 38 | |
| 128 | ASC | 20220105 | 20220117 | | 39 | | 36 | |

**Table S3.** Parameters in the stratified viscoelastic Burgers model

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Layer** | **Thickness/km** | ***V*P/km·s-1** | ***V*S/km·s-1** | ***ρ*/kg·m-3** | ***η*1/Pa·s** | ***η*2/Pa·s** |
| Upper crust | 10 | 5.90 | 3.41 | 2500 | — | |
| 10 | 6.18 | 3.57 | 2700 |
| Middle crust | 12 | 5.85 | 3.38 | 2600 | 9.0×1018 | 1.0×1019 |
| Lower crust | 10 | 6.40 | 3.59 | 3000 | 9.0×1018 | 1.0×1019 |
| 20 | 6.80 | 3.70 | 3100 | 9.0×1018 | 1.0×1019 |
| Upper mantle |  | 8.10 | 3.89 | 3350 | 0 | 1.0×1020 |

*V*p: P wave velocity, *V*s :S wave velocity, *ρ*: density, *η*1: transient viscosity coefficients, and *η*2: steady-state viscosity coefficients.