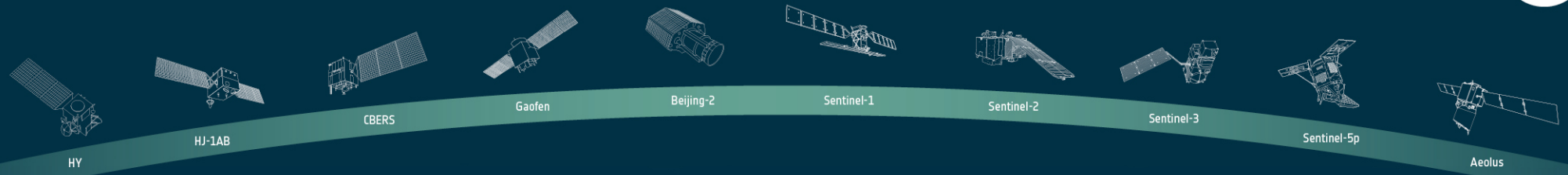


2022 DRAGON 5 SYMPOSIUM

MID-TERM RESULTS REPORTING

17-21 OCTOBER 2022

PROJECT ID: 59308

Seismic Deformation Monitoring and Earthquake Electromagnetism Anomaly Analysis by Big Satellite Data, Parallel Computation, and Artificial Intelligence Methods

Dragon 5 Mid-term Results Project

DATE: THURSDAY, 20/OCT/2022 **10:20AM-11:50AM**

ID. 59308

PROJECT TITLE:

SEISMIC DEFORMATION MONITORING AND EARTHQUAKE ELECTROMAGNETISM ANOMALY ANALYSIS BY BIG SATELLITE DATA, PARALLEL COMPUTATION, AND ARTIFICIAL INTELLIGENCE METHODS

PRINCIPAL INVESTIGATORS:

JIANBAO SUN (INSAR & SEISMIC), YAXIN BI(METHODS & ELECTROMAGNETIC)

CO-AUTHORS:

ZHAOYANG ZHANG, MINGJIA LI, BIN HAN, YUXIN BAO, YAXIN BI, XUEMING ZHANG, CECILE LASSERRE

PRESENTED BY:

JIANBAO SUN

Dragon 5 Mid-term Results Reporting

- Inform on the project's objectives
- Detail the Copernicus Sentinels, ESA, Chinese and ESA Third Party Mission data utilised after 2 years (complete slide 4)
- Detail the in-situ data measurements and requirements
- Provide details on field data collection campaigns and periods in P.R. China or other study areas
- Inform on the results after 2 years of activity
- Inform on the project's schedule, planning & contribution of the partners for the following year
- Report on the level and training of young scientists on the project achievements, including plans for academic exchanges

EO Data Delivery

Data access (list all missions and issues if any). NB. in the tables please insert cumulative figures (since July 2020) for no. of scenes of high bit rate data (e.g. S1 100 scenes). If data delivery is low bit rate by ftp, insert “ftp”

ESA Third Party Missions	No. Scenes
1.Sentinel-1 SAR	3000
2.ERS-1/2	0
3.Envisat	0
4.	
5.	
6.	
Total: S1	3000
Issues:	

ESA Third Party Missions	No. Scenes
1.	
2.	
3.	
4.	
5.	
6.	
Total:	
Issues:	

Chinese EO data	No. Scenes
1.Gaofen-7	2
2.	
3.	
4.	
5.	
6.	
Total:	2
Issues:	

European Young scientists contributions in Dragon 5

Name	Institution	Poster title	Contribution
Hubert Skladanowski	Ulster University		
Maja Pavlovic	Ulster University		
Vyron Christodoulou	British Geological Survey		

Chinese Young scientists contributions in Dragon 5

Name	Institution	Poster title	Contribution
Zhaoyang Zhang	Institute of Geology, China Earthquake Admin.	Investigate Shale Gas Production Induced Surface Deformation with Numerical Models in Poroelasticity Medium	InSAR deformation modelling
Mingjia Li	Institute of Geology, China Earthquake Admin & PKU	No	NCP project
Jiangtao Qiu	Institute of Geology, China Earthquake Admin	No	Xinjiang project

Team Composition (European side)

- Dr Yaxin Bi is a Reader in Artificial Intelligence at Ulster University. He was PI of Dragon 3 2015 and 2107, and Dragon 4 38577.
- Dr Ming Jun Huang is a Reader in the field of renewable energy and environmental sustainability at the Centre for Sustainable Technologies (CST) at Ulster University.
- Dr Vyron Christodoulou, young scientist, British Geological Survey
- Hubert Skladanowski, MSc student, at Ulster University
- Ms Maja Pavlovic, a PhD candidate, at Ulster University

- Cecile Lasserre, LGLTPE, Université Lyon 1, CNRS, France
- Marie-Pierre Doin, Université Grenoble-Alpes, CNRS, ISTerre, Grenoble, France
- Laëtitia Lemrabet, Université Grenoble-Alpes, CNRS, ISTerre, Grenoble, France

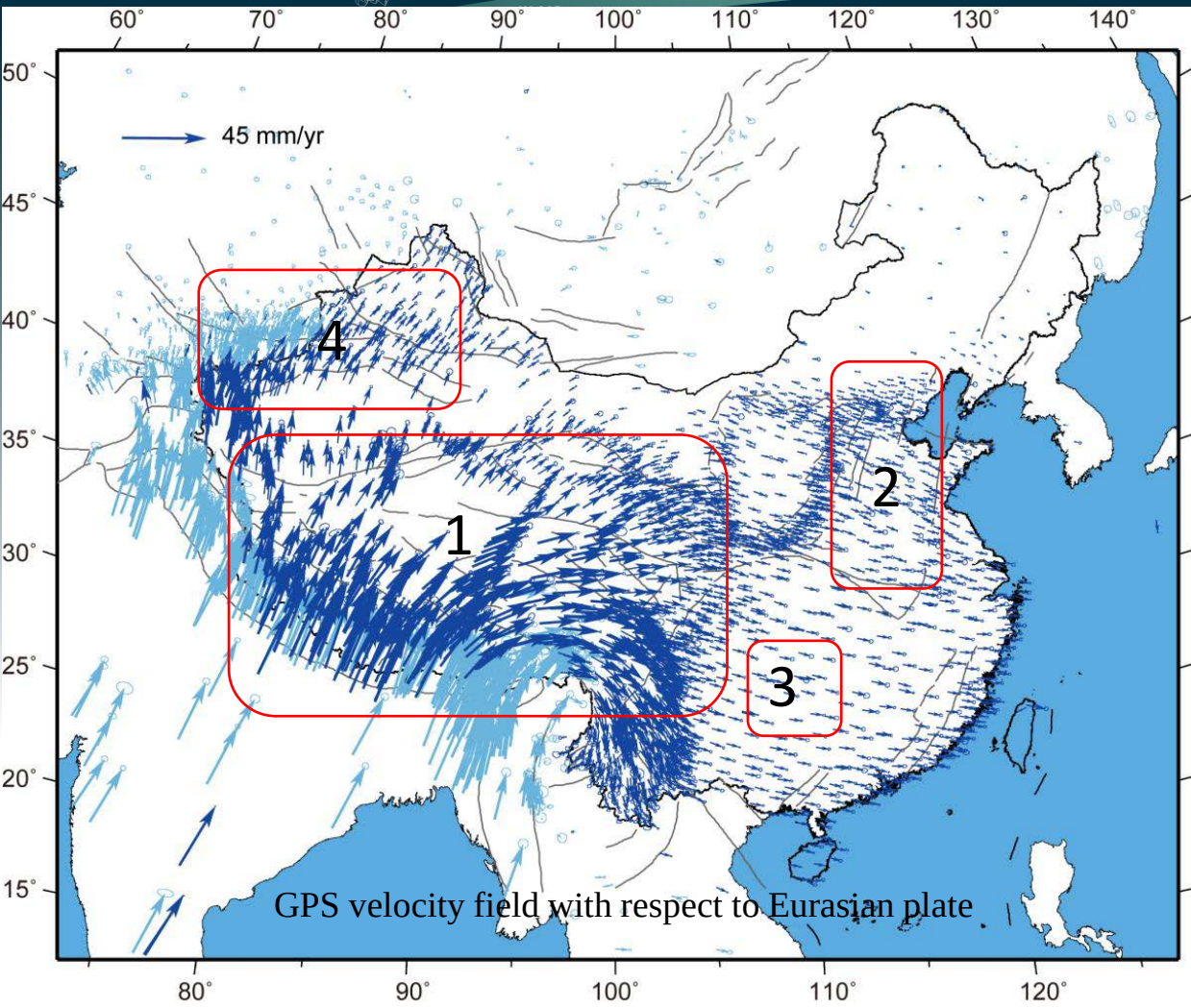
Team Composition (Chinese side)

- Jianbao Sun, Professor, in Institute of Geology, CEA
- Ji Tang, Professor, in Institute of Geology, CEA
- Miss Bing Han, PhD candidate, in Institute of Geology, CEA
- Zhaoyang Zhang, MSc student, in Institute of Geology, CEA
- Mingjia Li, PhD. candidate, , in Institute of Geology, CEA & PKU

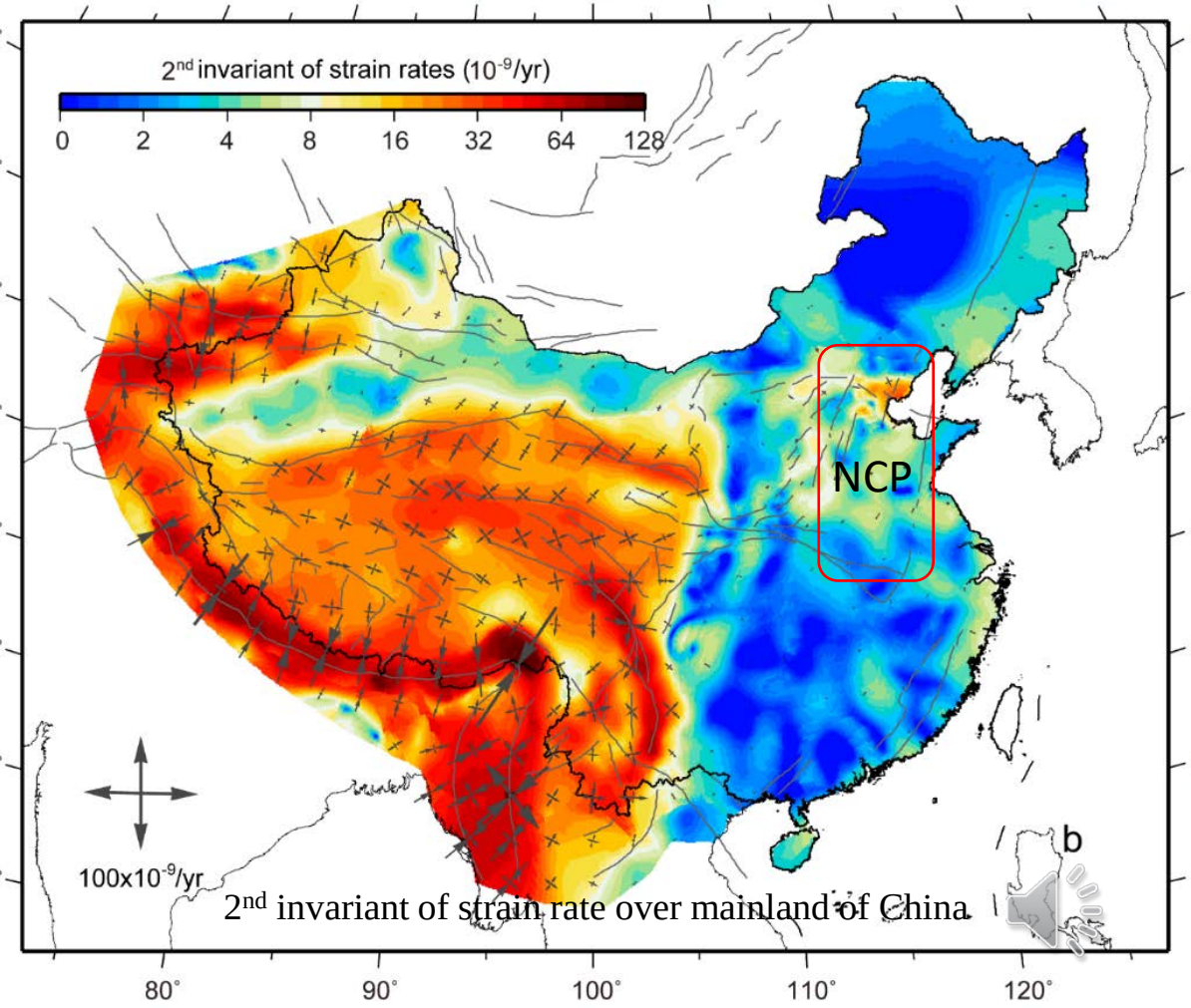
- Xuemin Zhang, Professor, in Institute of Earthquake Forecasting (IEF), China Earthquake Administration (CEA).
- Dr. Jianping Huang, Associate Professor, in Institute of Crustal Dynamics (ICD), CEA.
- Dr. Pan Xiong, Associate Professor, in IEF, CEA
- Dr. Xinyan Ouyang, Associate Researcher, in IEF, CEA.
- Dr. Qiao Wang, Co-PI of the SCM onboard CSES at ICD, CEA .
- Mr. Yulin Zhou, MSc student, in IEF, CEA
- Mr Xiaohui Du, MSc student in IEF, CEA.

Results after 2 years of activity

GPS horizontal velocities and strain rate map over mainland of China by Wang & Shen, 2020



GPS velocity field with respect to Eurasian plate

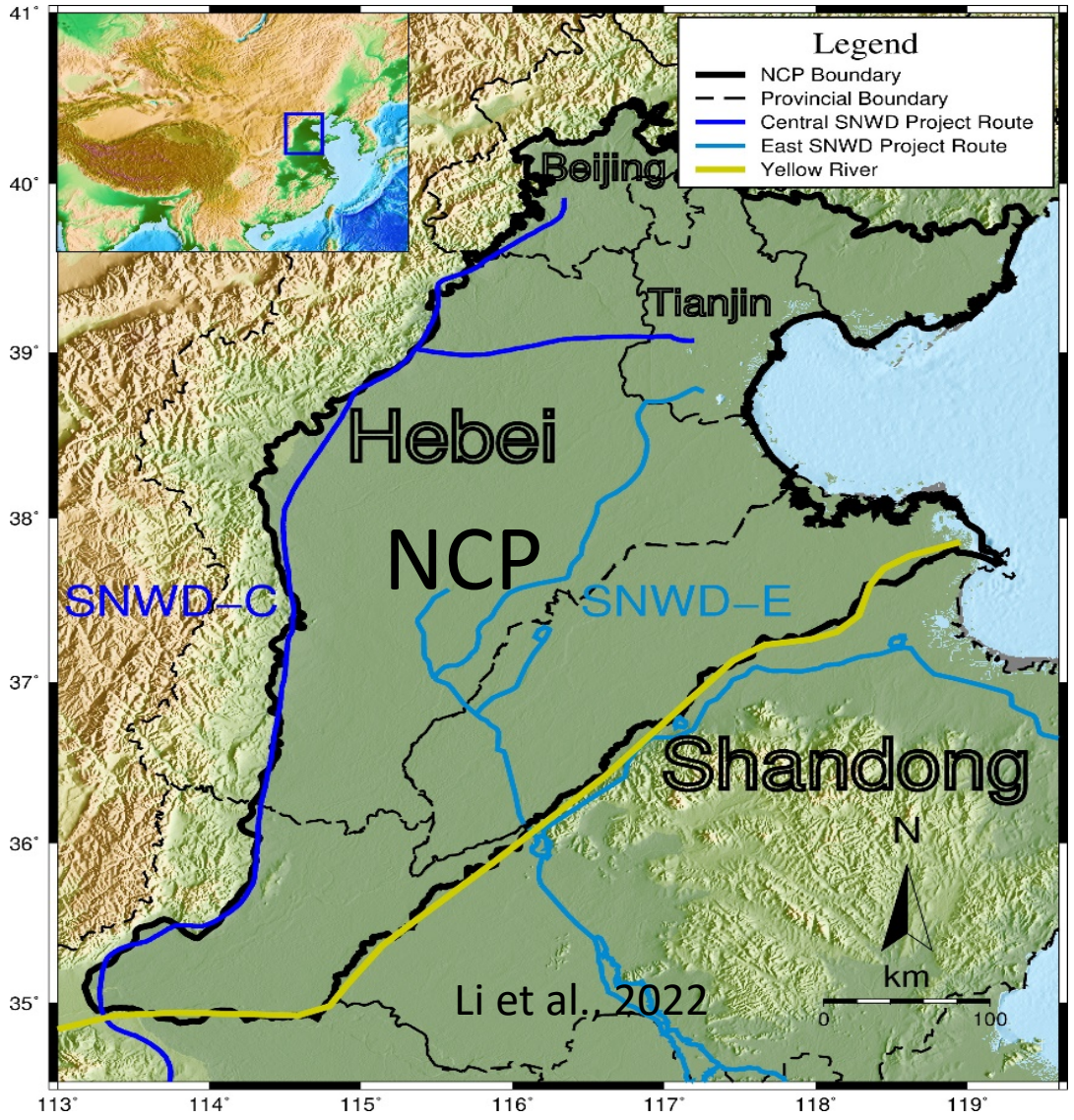


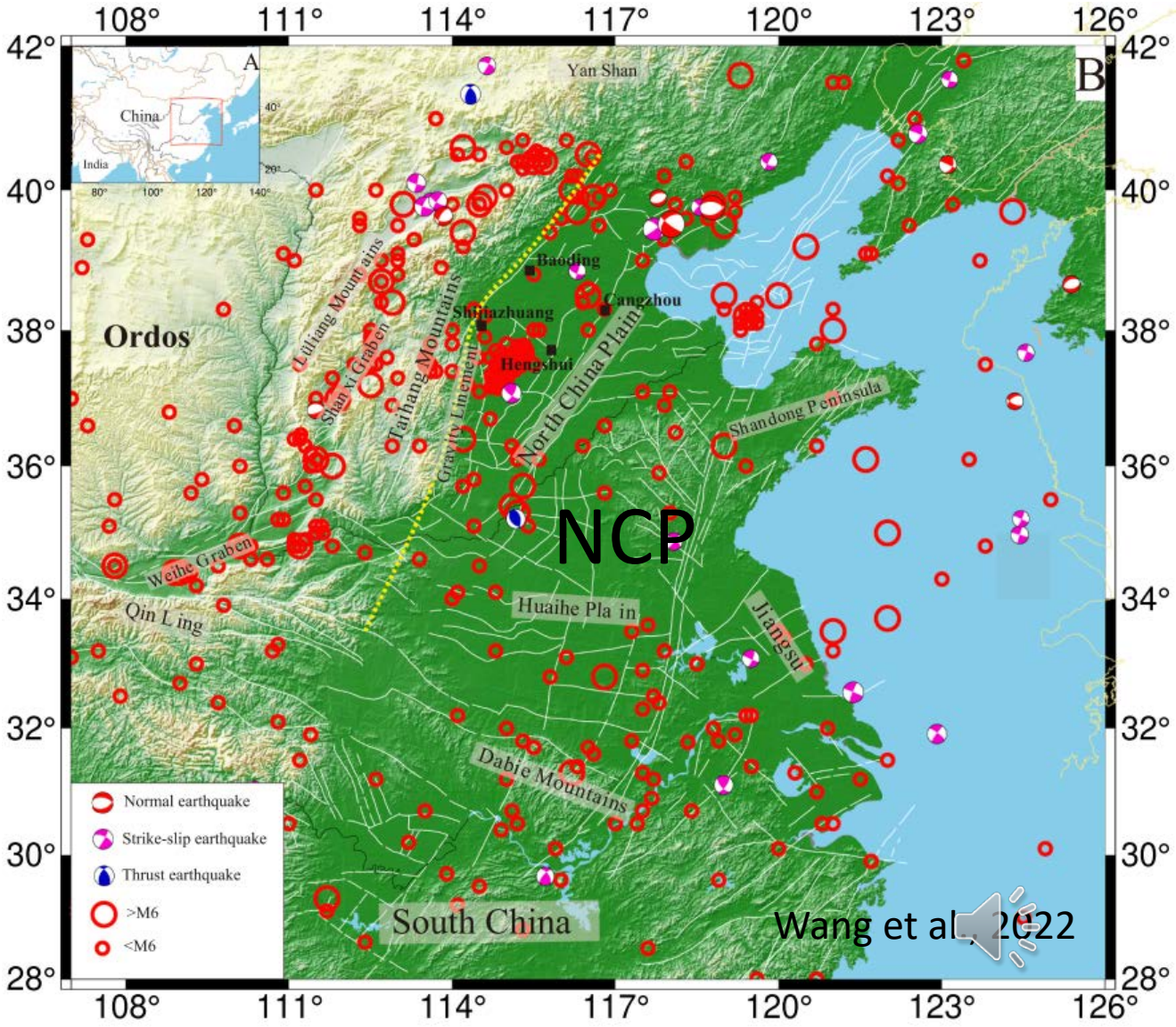
2nd invariant of strain rate over mainland of China

GPS velocity field with respect to Eurasian plate

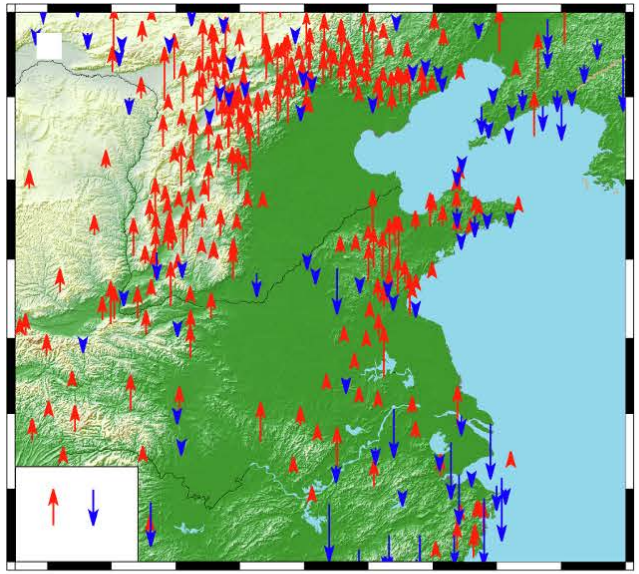
2nd invariant of strain rate over mainland of China

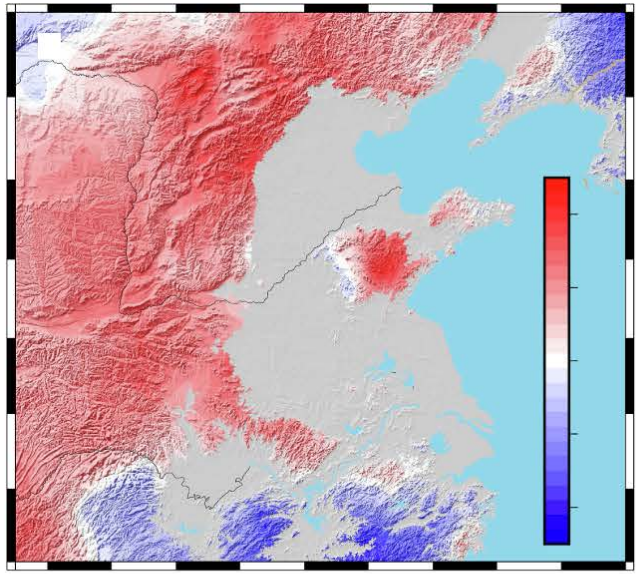
Results after 2 years of activity
Part 1. North China Plain surface deformation

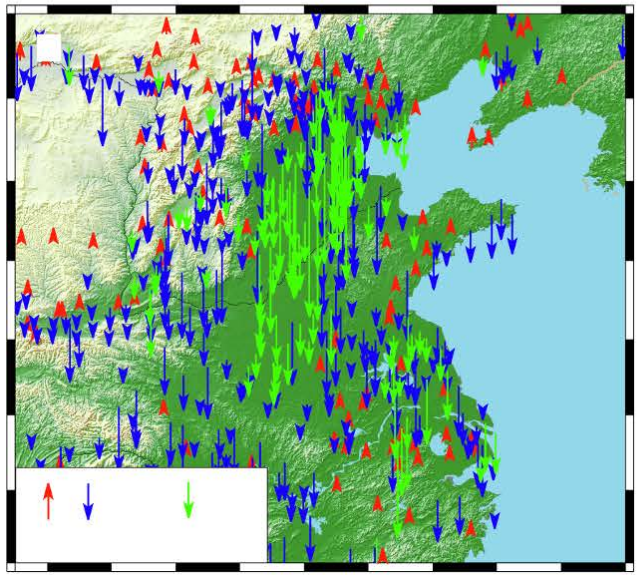


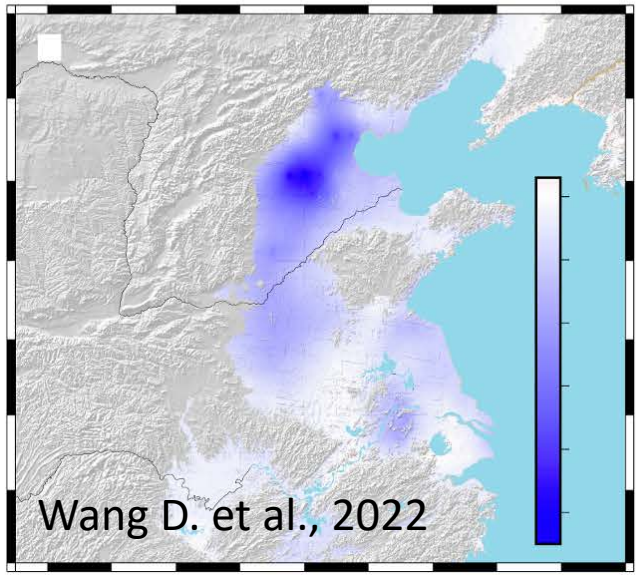


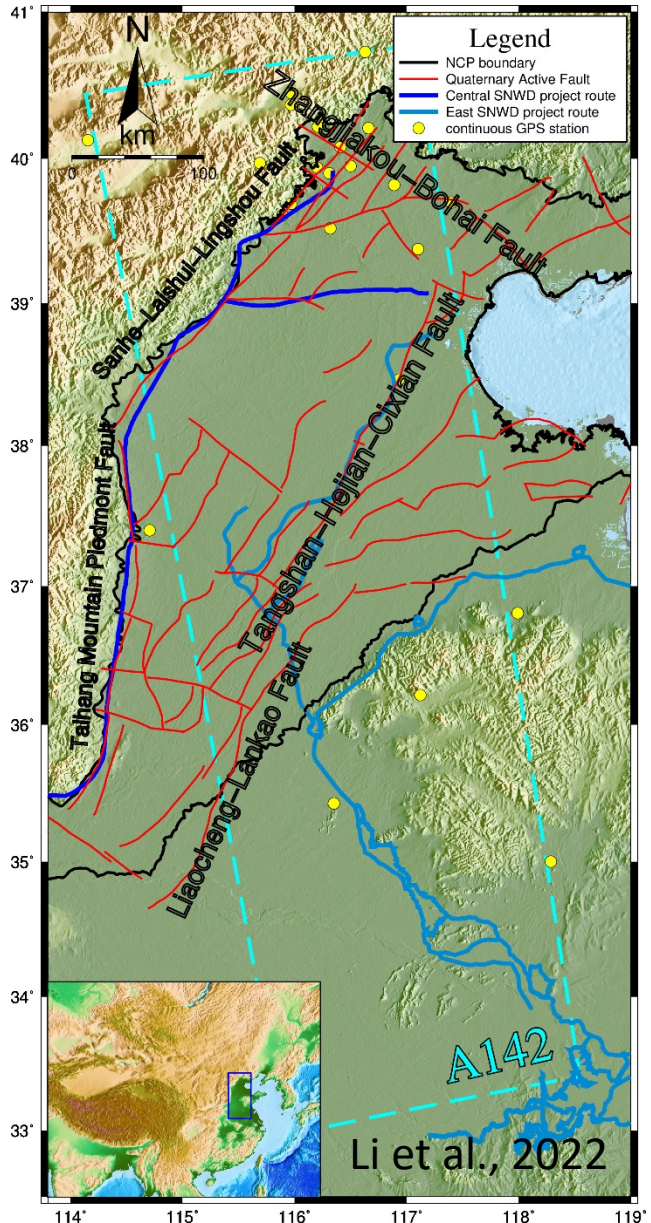
Results after 2 years of activity
Part 1. North China Plain surface deformation



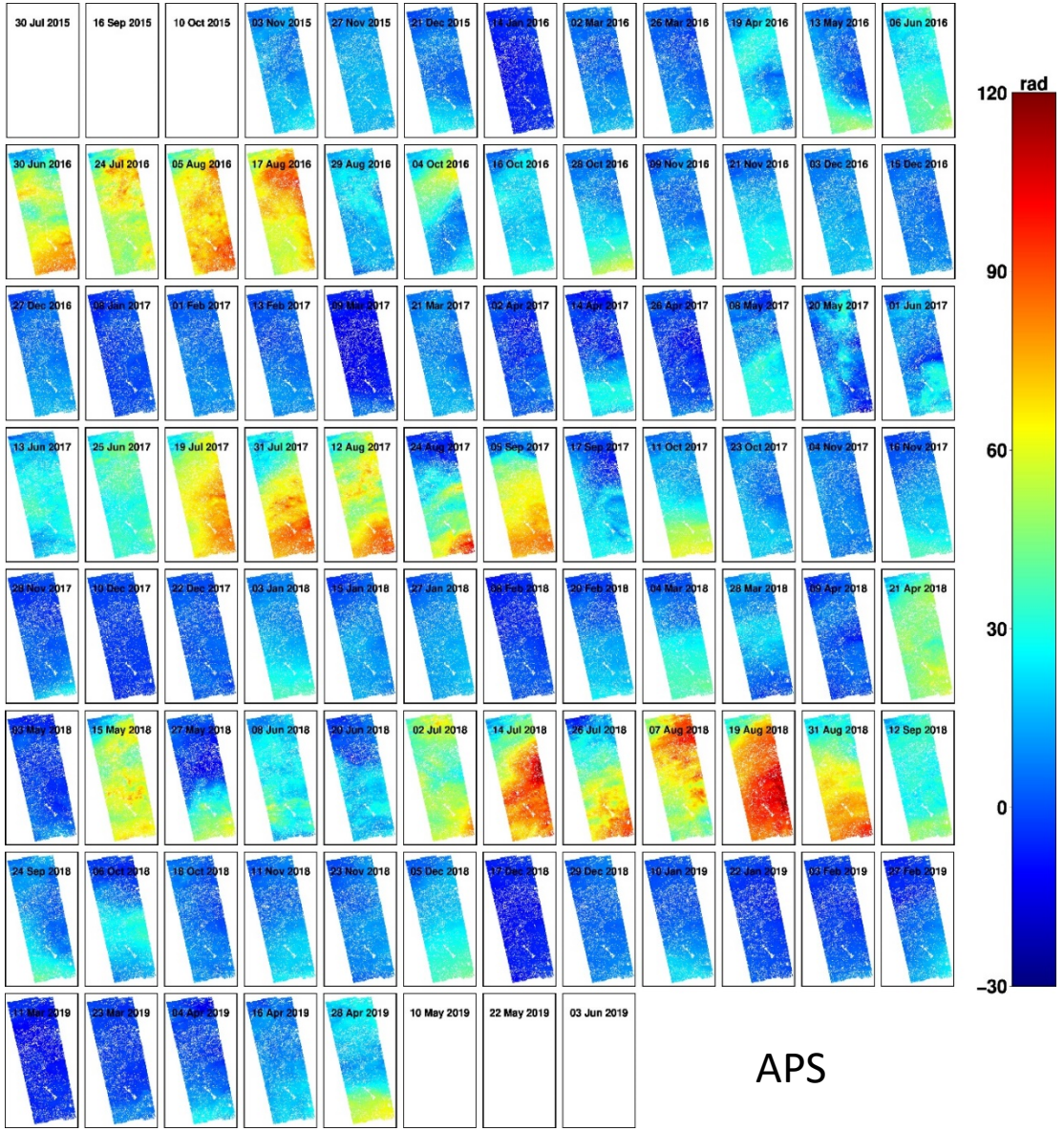




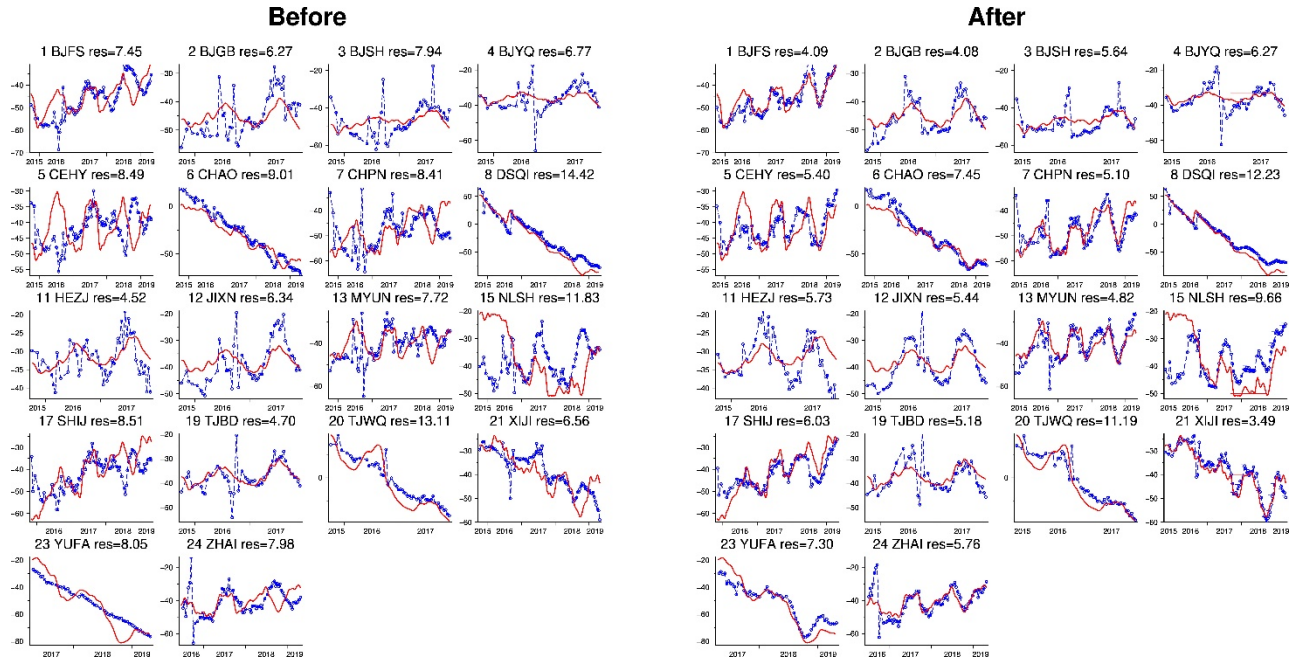


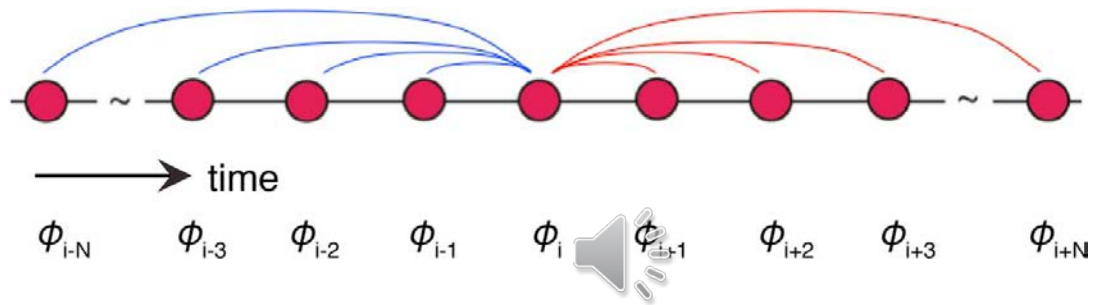


Results after 2 years of activity
Part 1. North China Plain surface deformation



APS

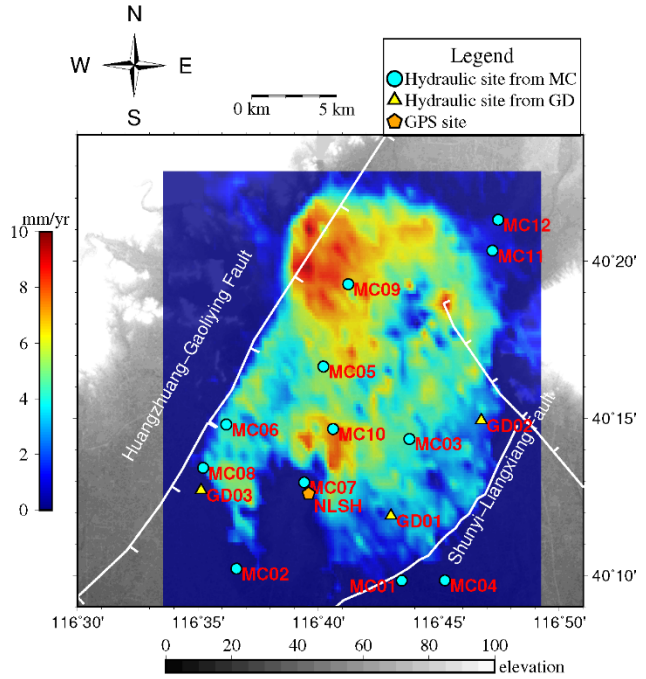


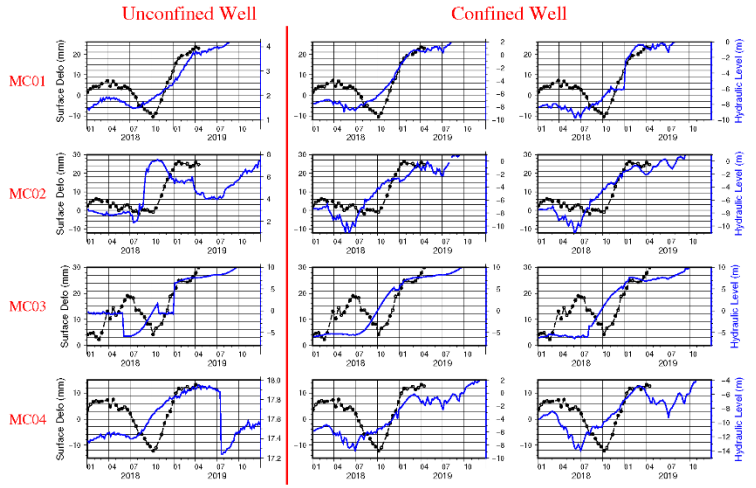


Li et al., 2022

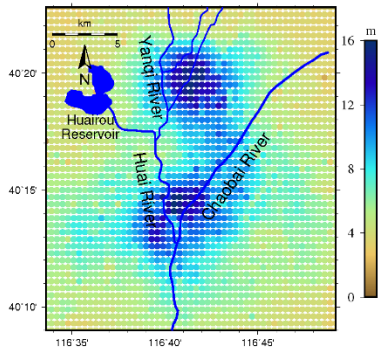
Results after 2 years of activity
Part 1. North China Plain surface deformation

Surface uplift and groundwater level rise caused by South to North Water Diversion Project at HGRS, Beijing, China

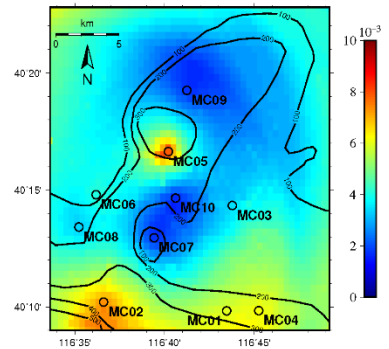


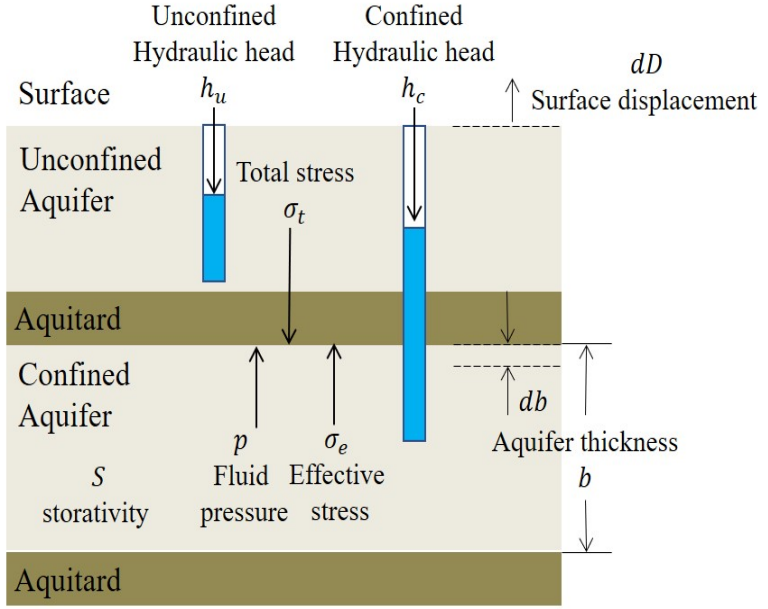


storativity



water level change

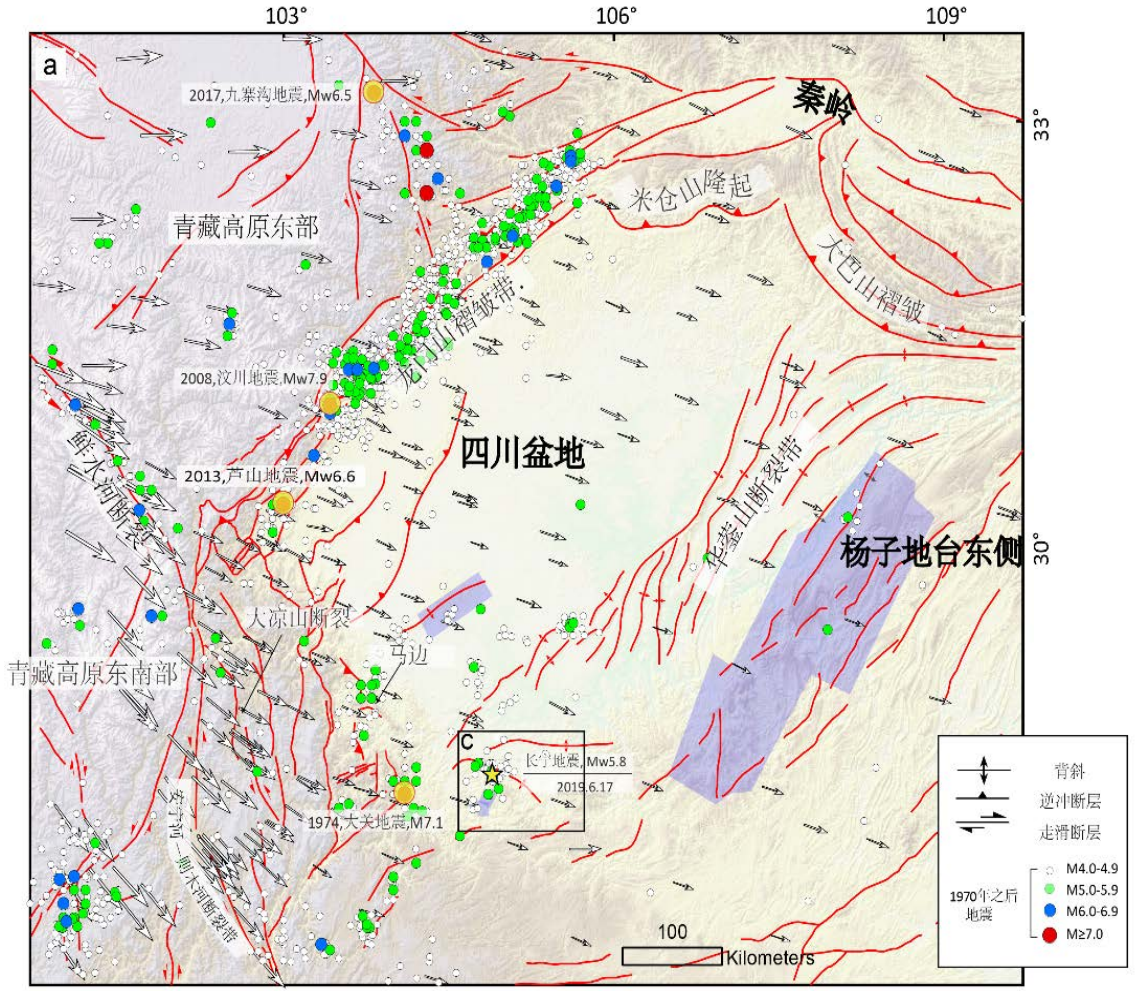


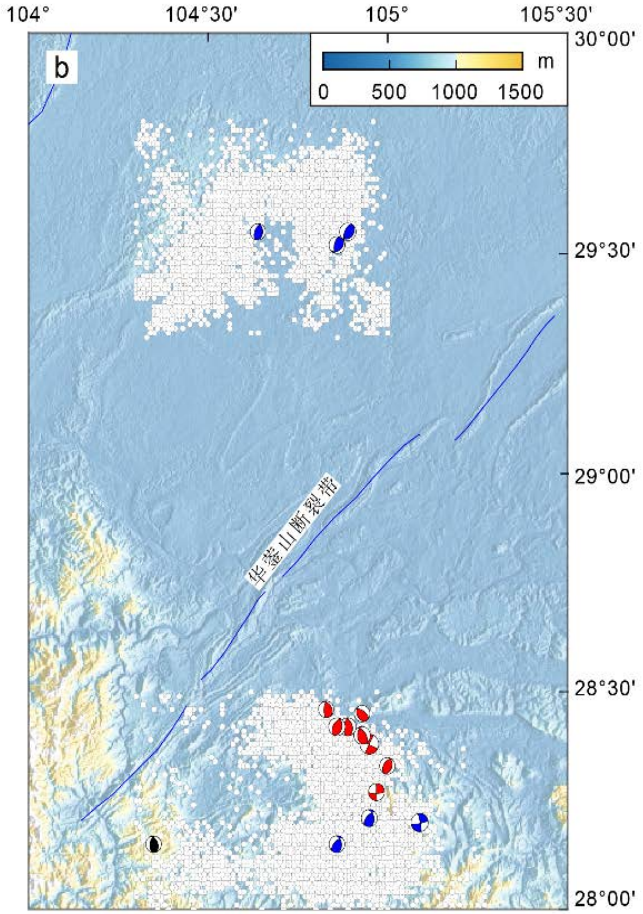


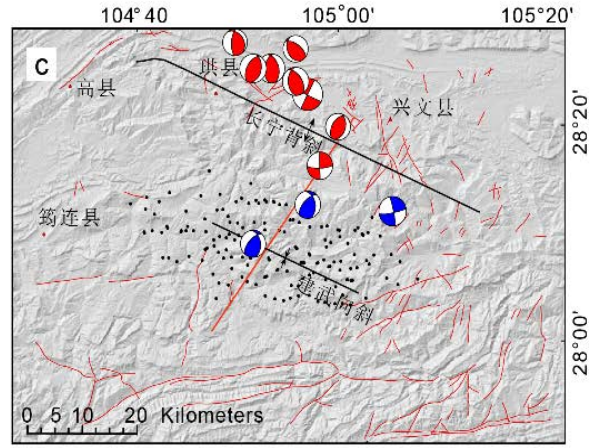
SNWD project models

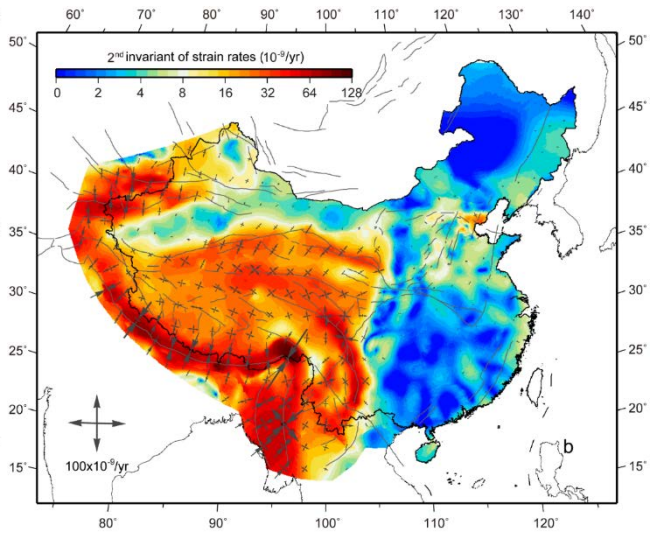
Li et al., 2022

Results after 2 years of activity
Part 2. Induced Surface deformation and seismicity



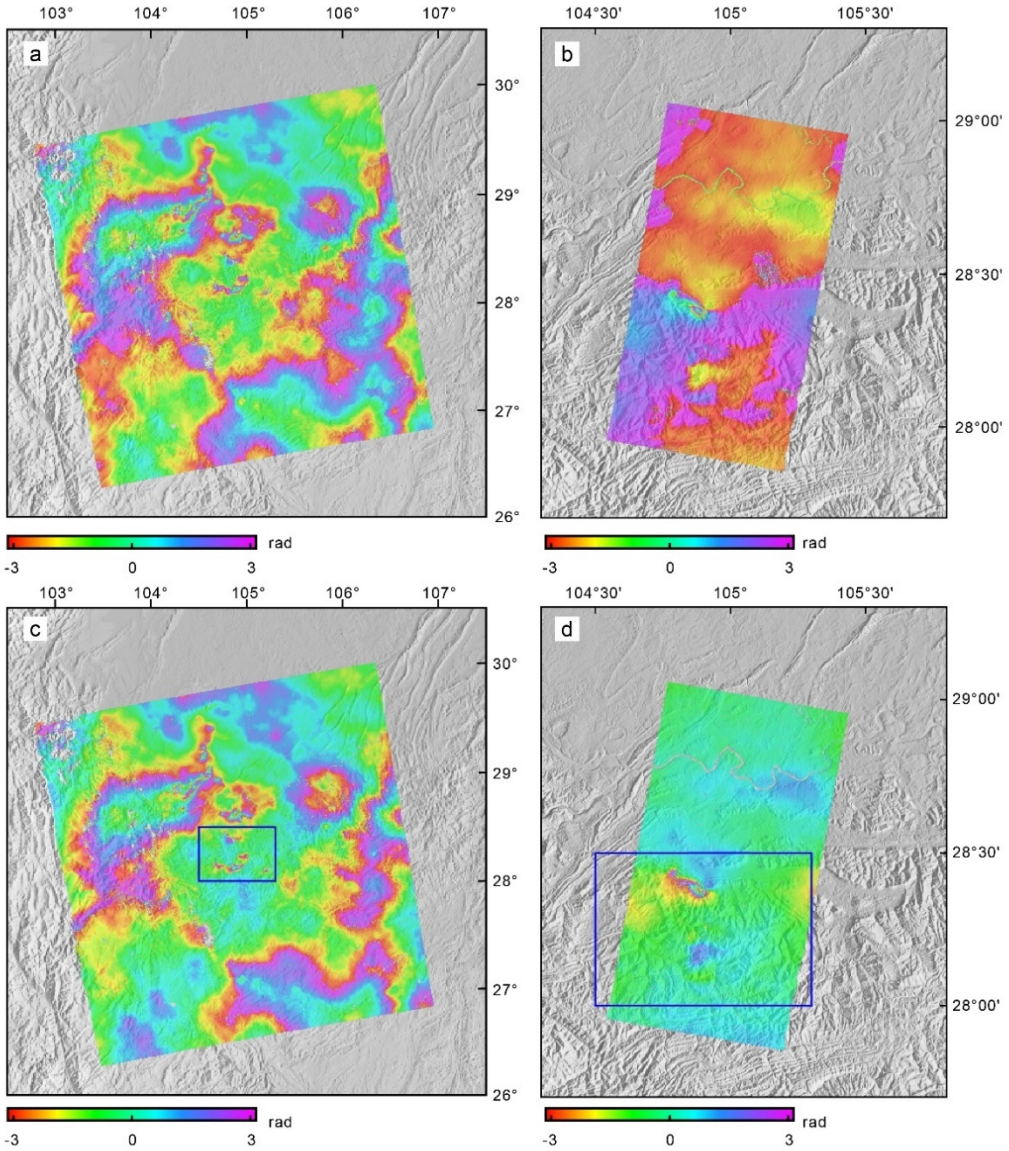


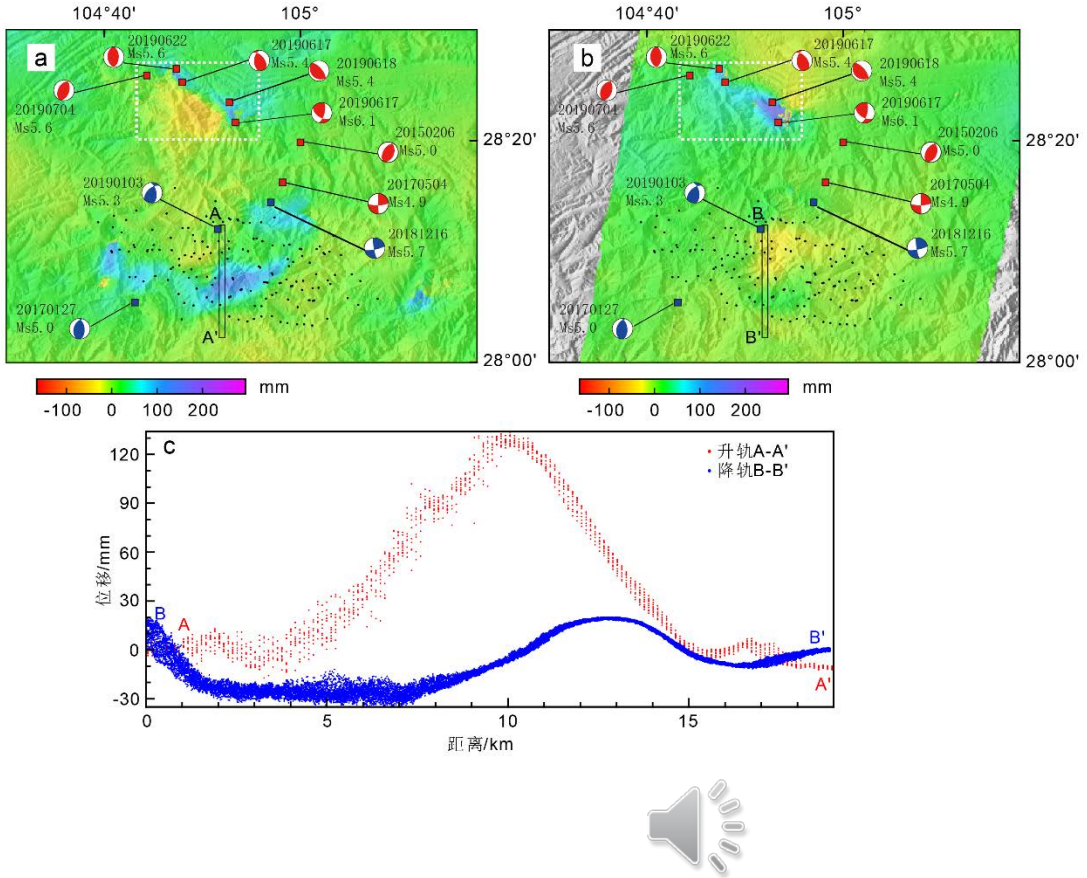




Bao et al., 2022

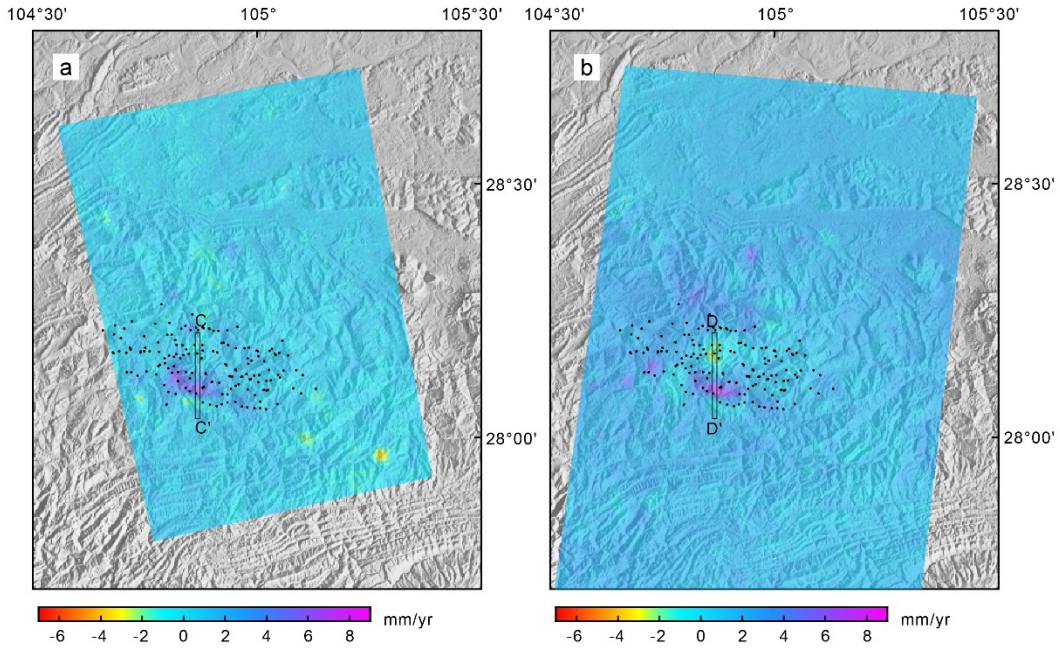
Results after 2 years of activity
Part 2. Induced Surface deformation and seismicity

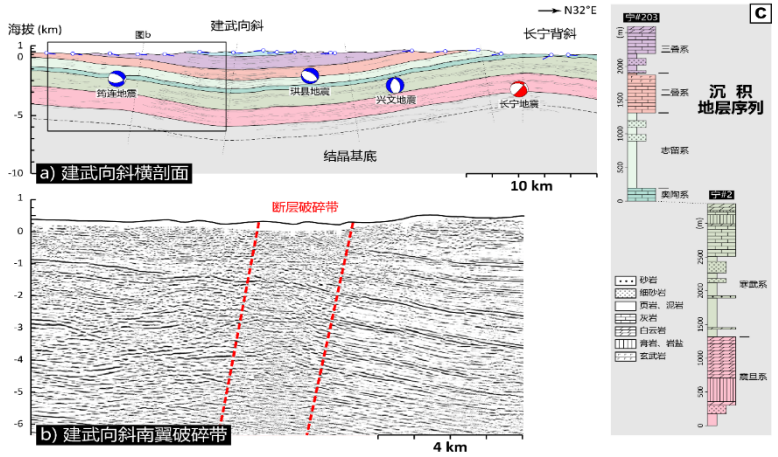


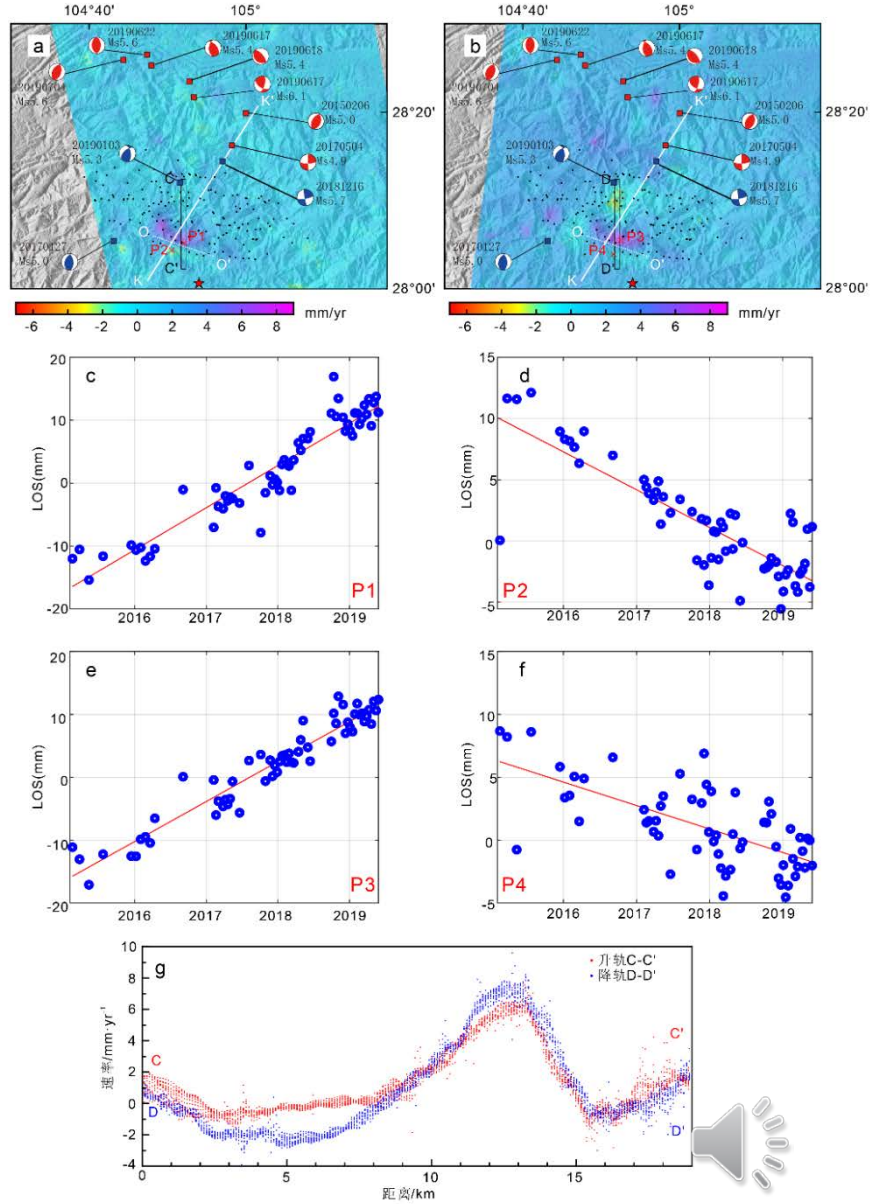


Bao et al., 2022

Results after 2 years of activity
Part 2. Induced Surface deformation and seismicity

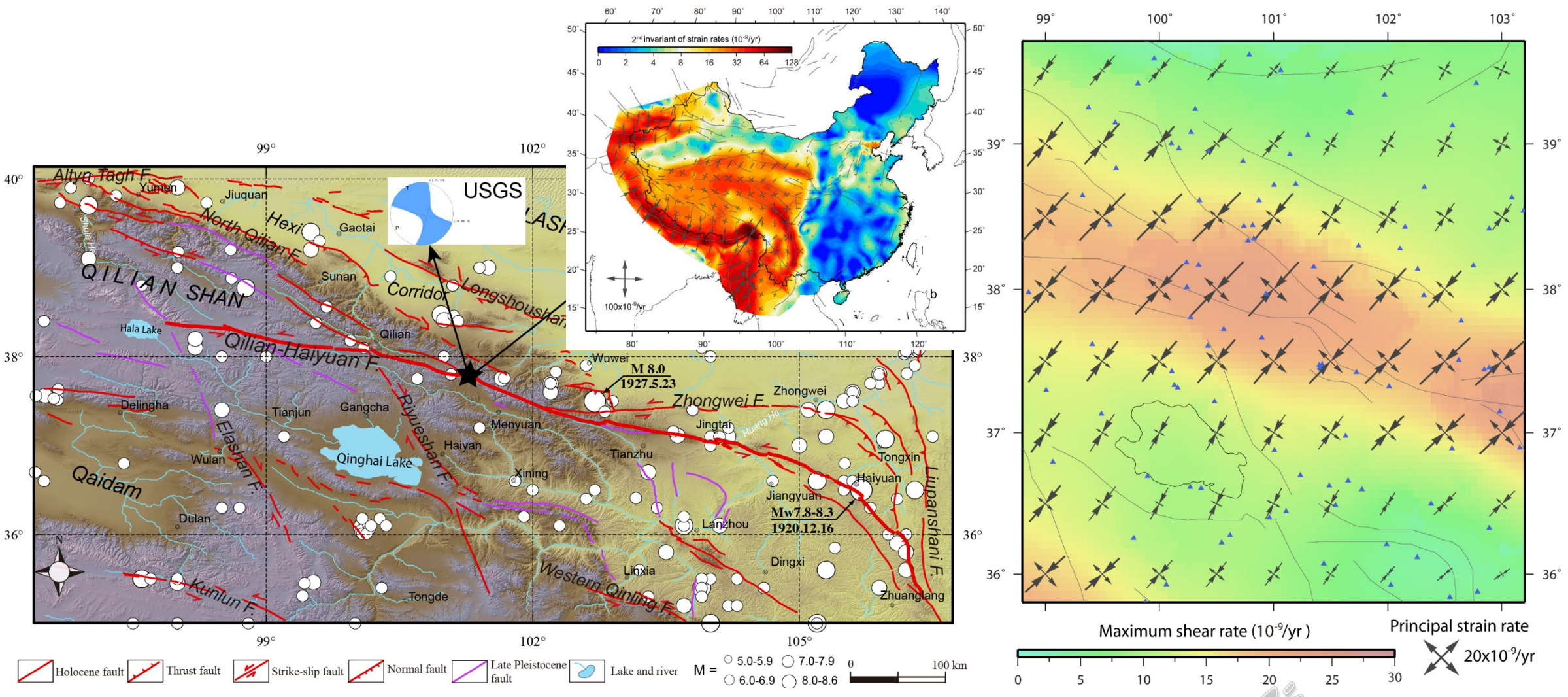






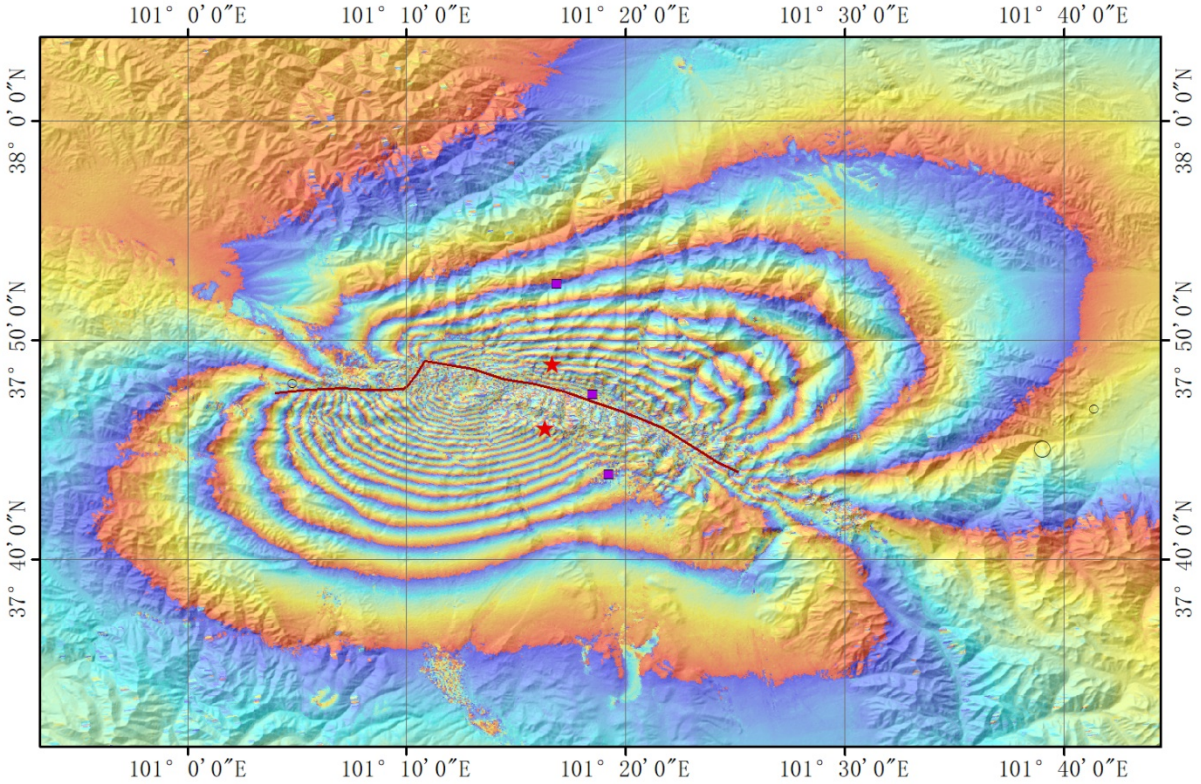
Bao et al., 2022

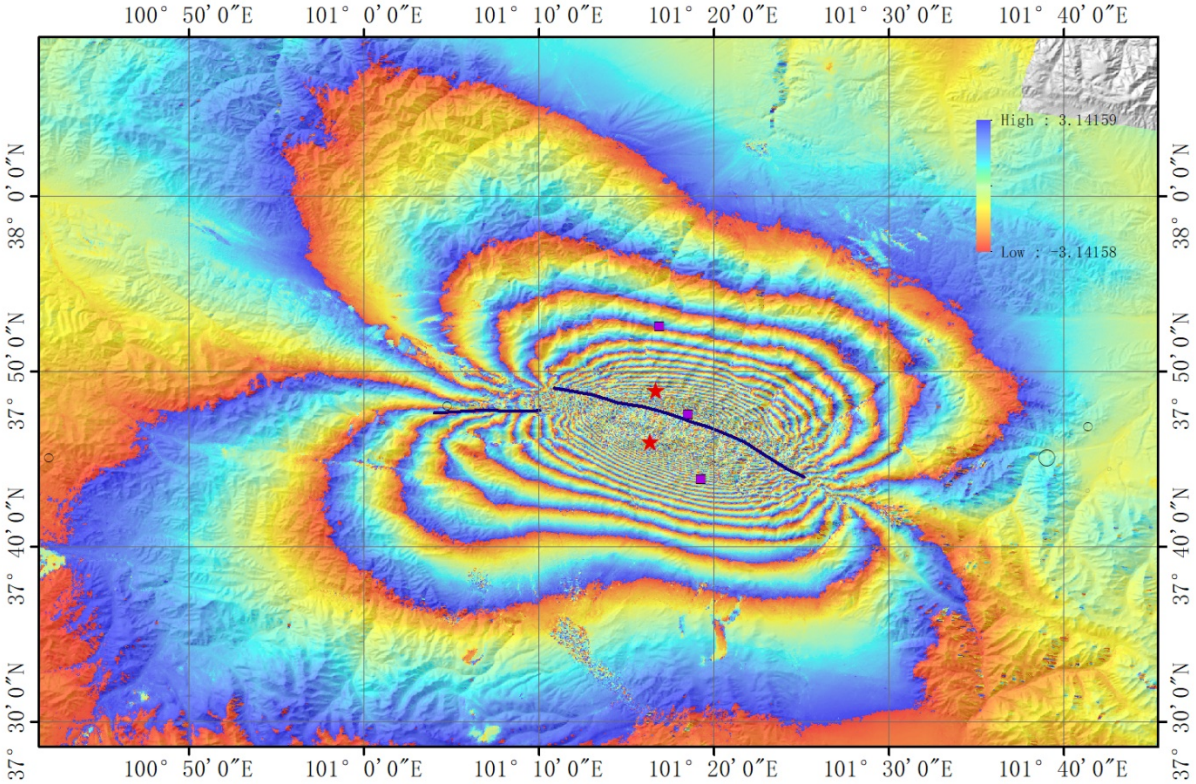
Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China



Sun et al., 2022

Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China





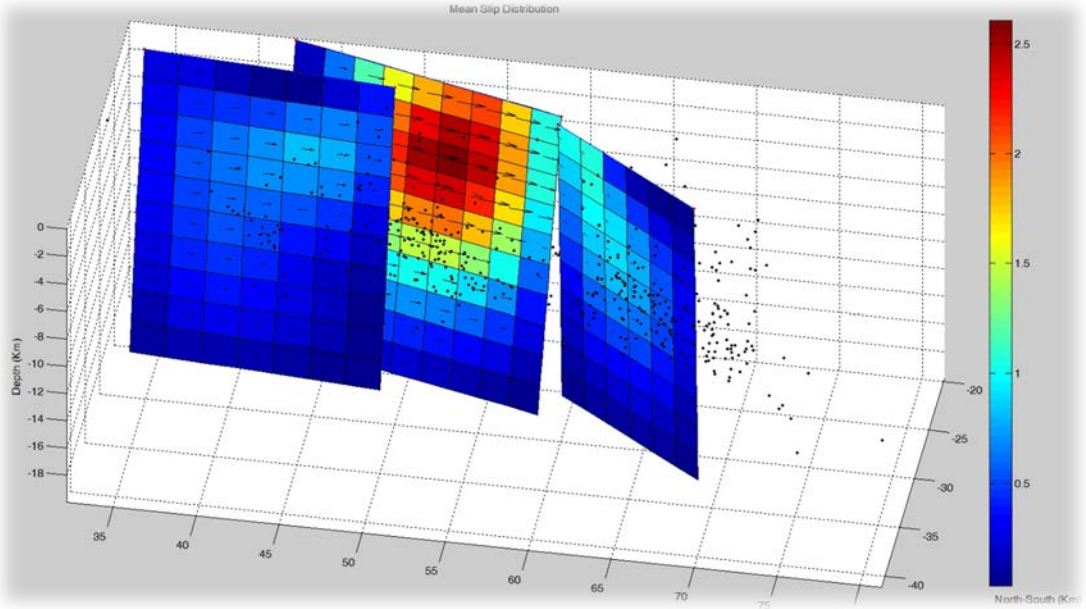
Sun et al., 2022

Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China

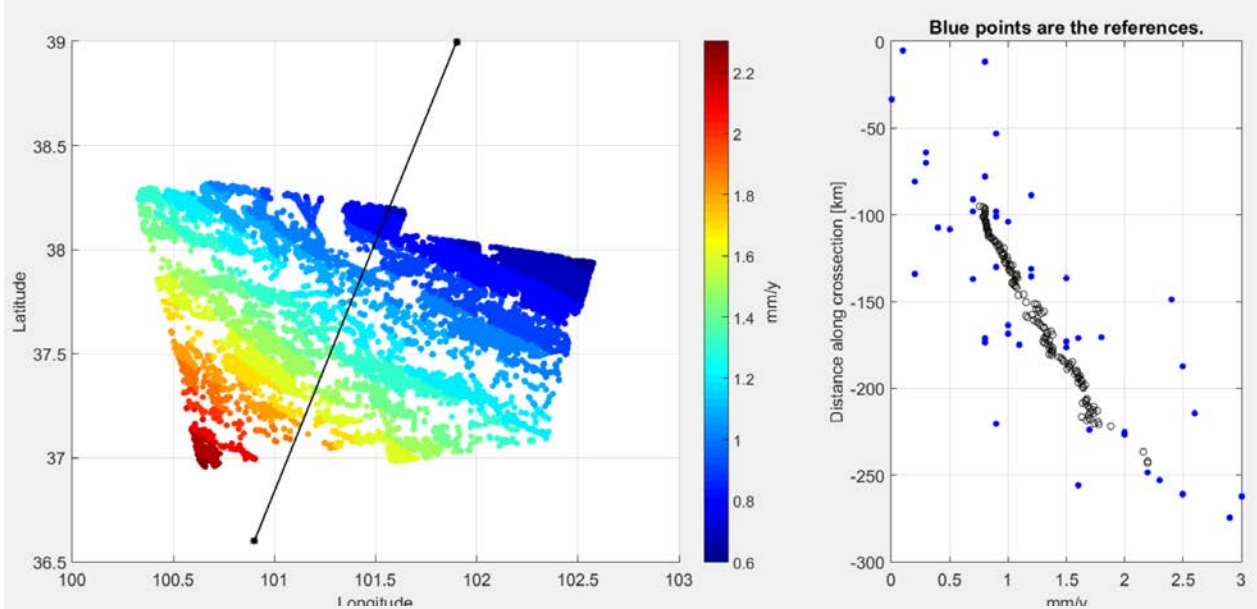
Yuan D. et al., 2022

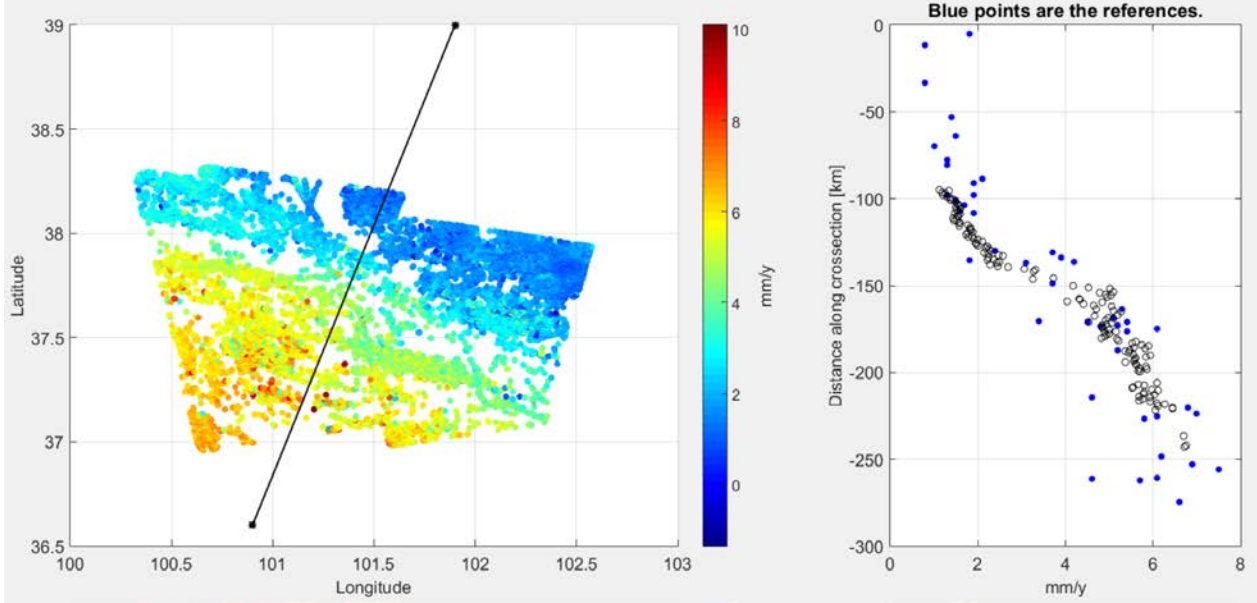
Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China

Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China

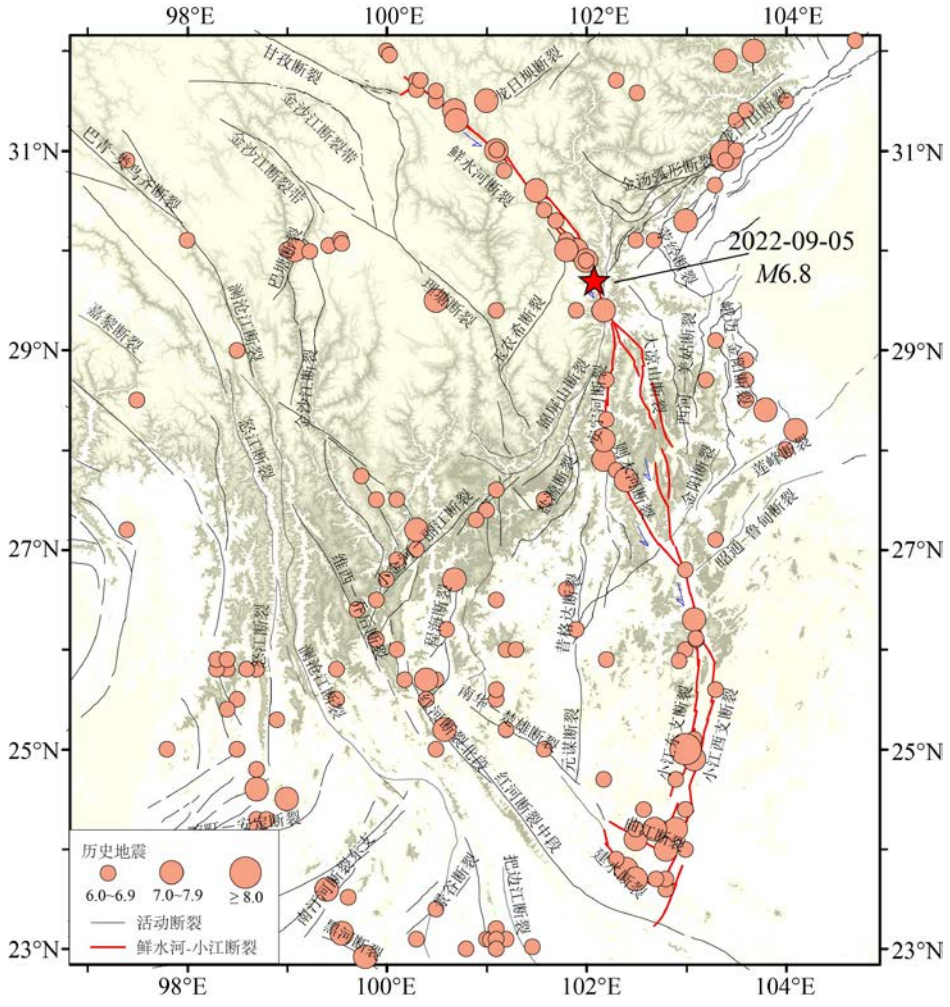


Sun et al., 2022

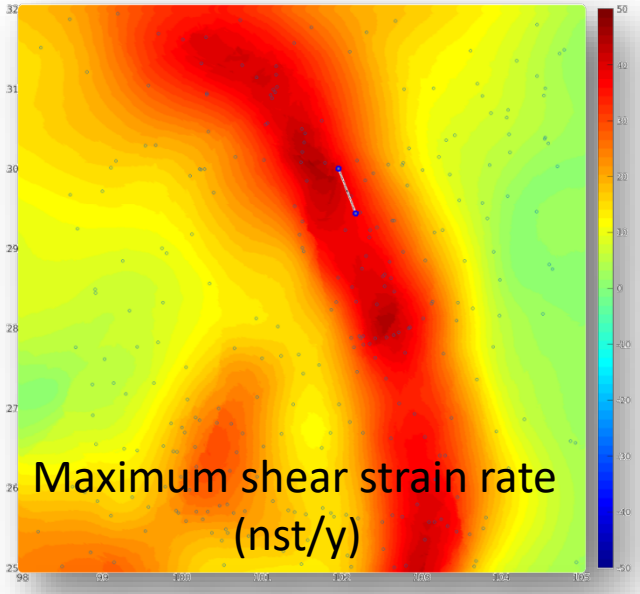


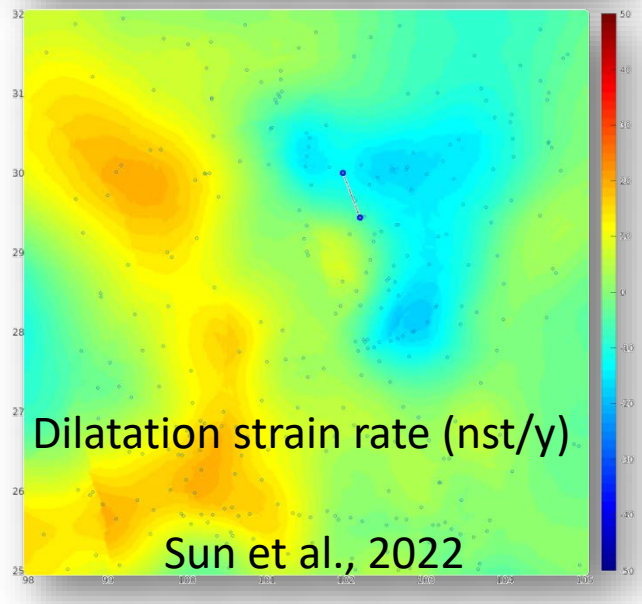


Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China

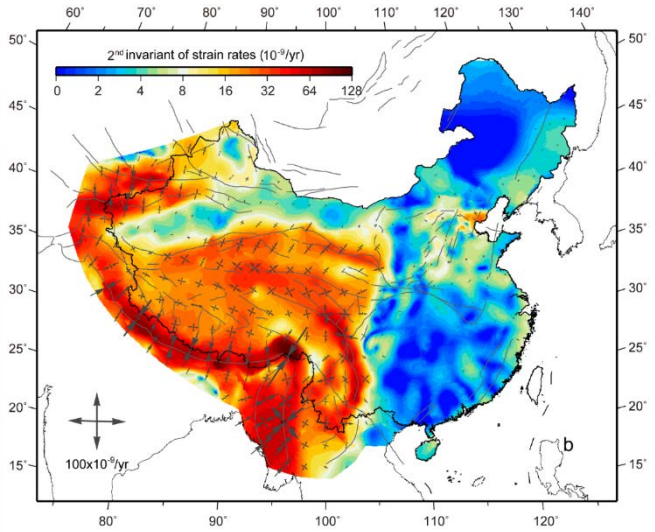


Cheng et al., 2022





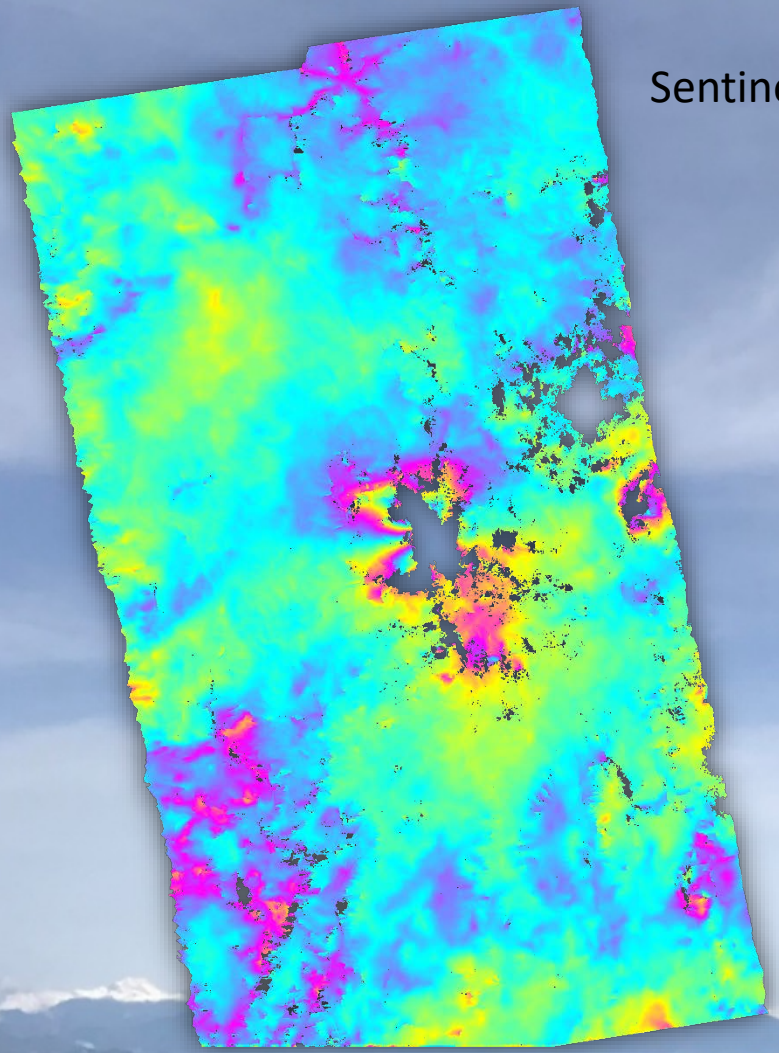
Sun et al., 2022

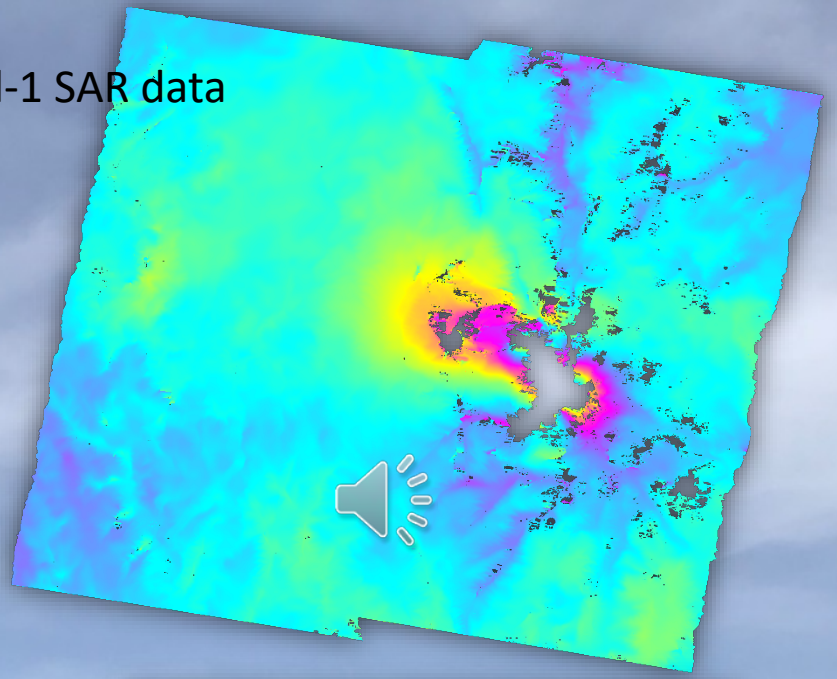


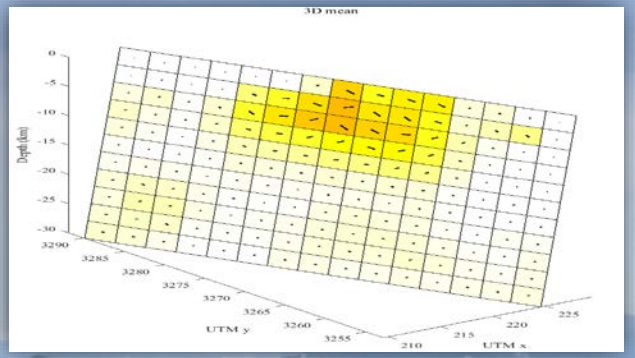
Wang and Shen, 2022

Results after 2 years of activity
Part 3. Seismic and interseismic deformation in China

Sentinel-1 SAR data

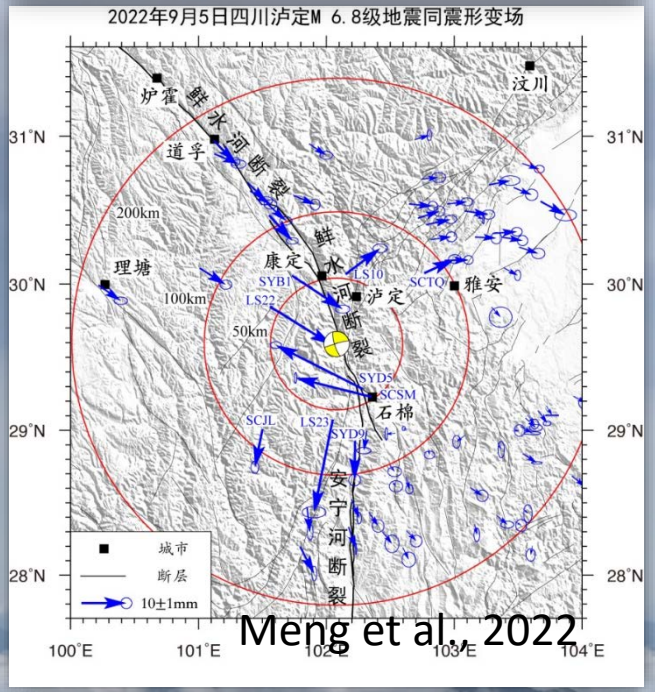






Max 1.5 m strike-slip near surface!

Sun et al., 2022



Meng et al., 2022


Thanks for your attention!