2010 AEC-NRC Bilateral Technical Meeting

Re-evaluation and Enhancement Plan of Seismic Safety for NPPs in Taiwan

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Taiwan Power Company

Contents

- Newly identified events
- Geology investigation
- Plan of re-evaluation of NPPs
- Investigation schedule

Faults in Taiwan (2010)

Active fault :

first class : 20

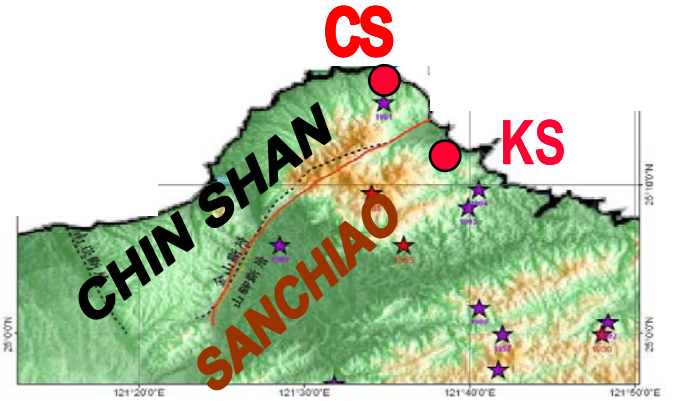
second class : 13

Suspect fault : 4

Chin Shan and Sanchiao Fault

Chin shan fault :

Noncapable fault according to USNRC definition.



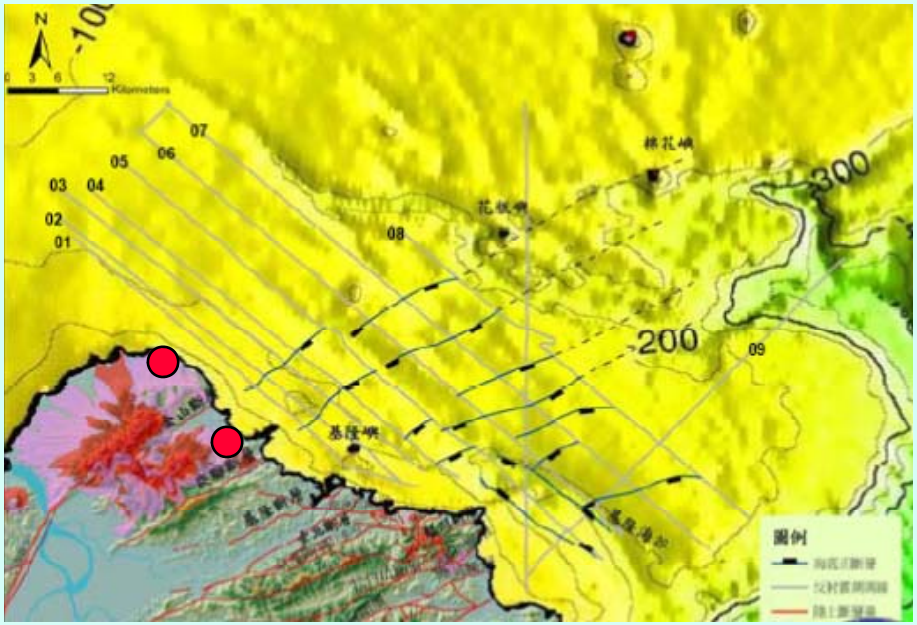
- **Design phase (1970)**
  Assumed Chin shan fault as a control capable fault.

- **Sanchiao fault :**
  Announced as an active fault by CGS In 2007. 7km to CS, 5km to KS.

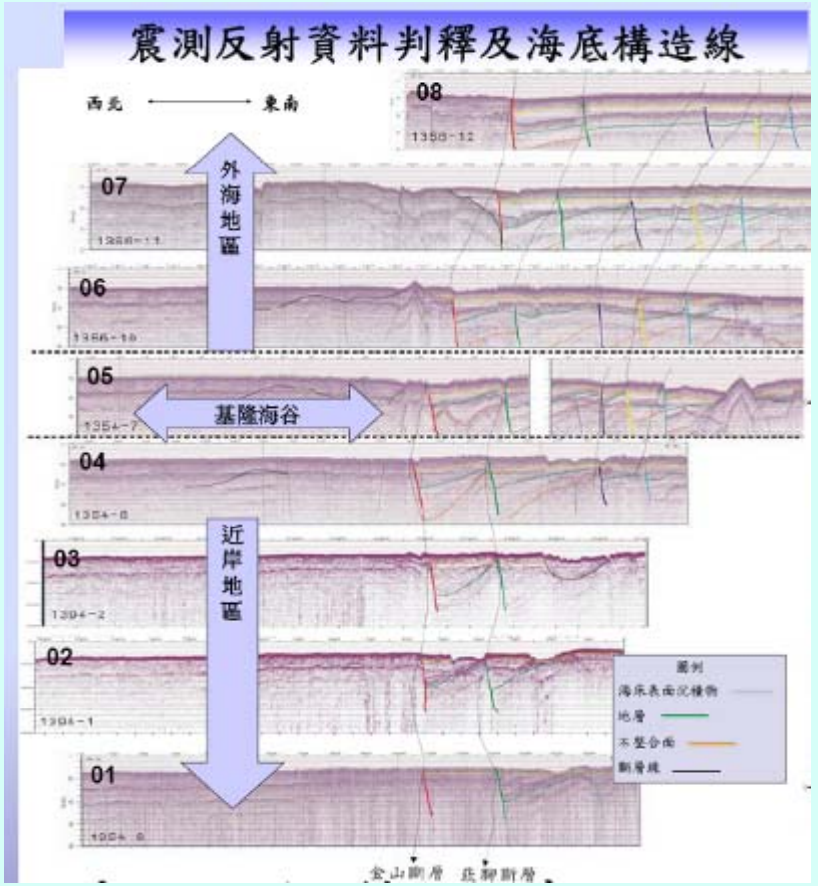
- **Fault length 34 km onshore, 16.6(?) km offshore.**

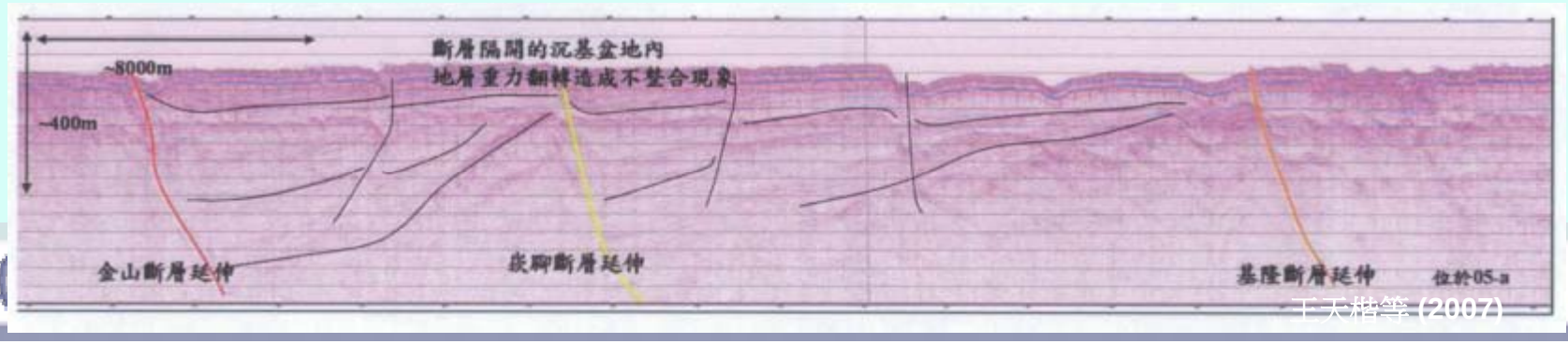
Sanchiao Fault Offshore Part

Offshore Inference

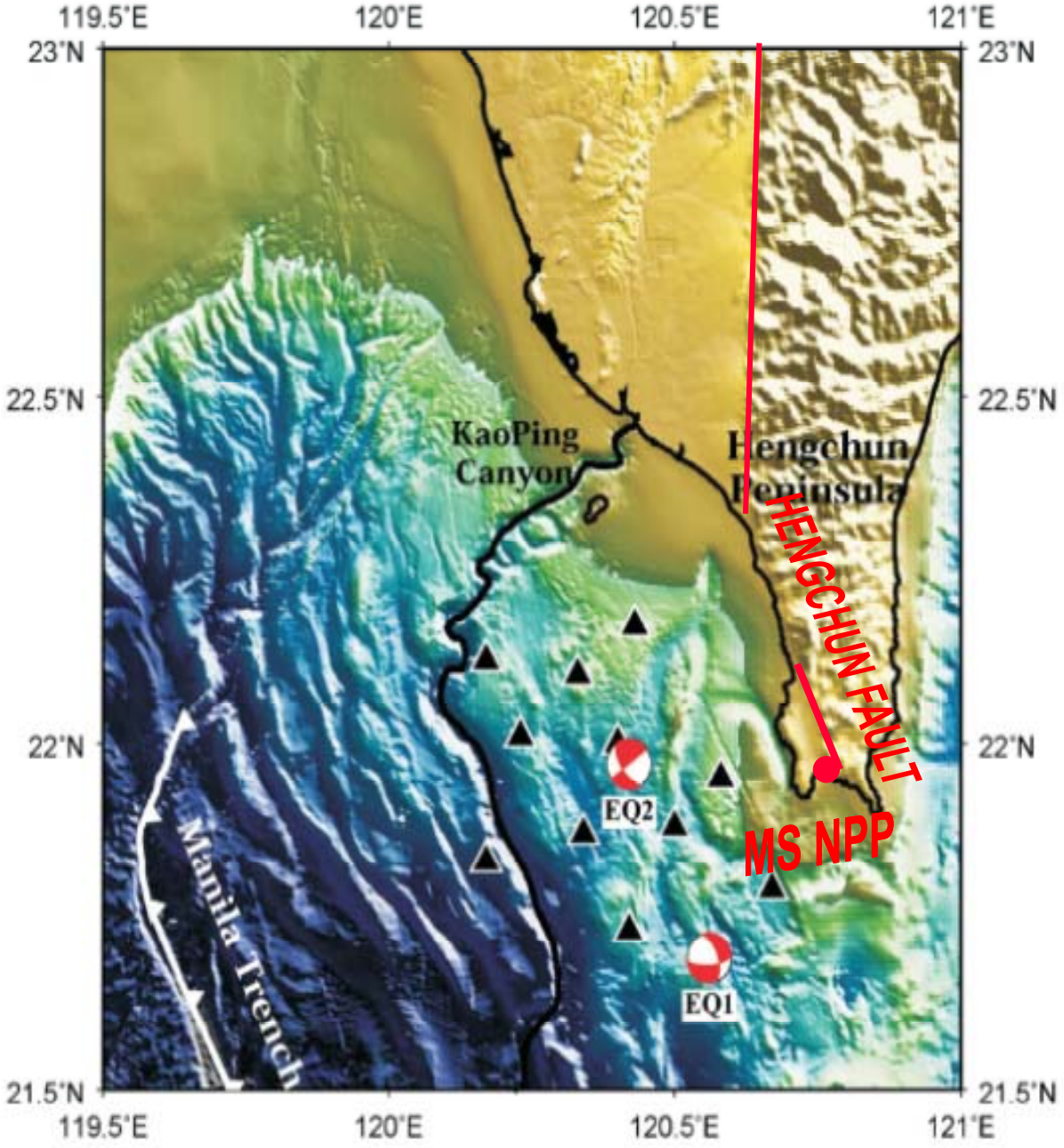


CGS(2007)





王天牧等 (2007)



Earthquake doublet

- **Dec.26, 2006**

Epicenter

1st EQ ：

ML=7.0,

Distance=36.5km,

Depth=44km,

2nd EQ：

ML=7.0,

Distance=34.1km,

Depth=50km.

- **Maanshan NPP**

OBE=0.2g

Free field measured

PGA=0.165g

Hengchun Fault

- **Design phase (1976)**

  According to USNRC definition:

  Hengchun fault : noncapable fault.

- **Taiwan Central Geological Survey,**

  Suspect fault, 2000

  Active fault, 2009

- **1.5km to MS.**
- **Fault length 16 km onshore, not clear offshore.**

Geology And Seismicity Re-evaluation

- To perform geological survey offshore and onshore.
- To evaluate the geological characteristics of Shanchiao fault and Hengchun fault.
- To evaluate the effects of Sanchiao fault on Chinshan and Kuosheng NPPs and Hengchun fault on Maanshan NPP.
- Seismic Margin Analysis of NPPs.
- Schedule : Dec. 2009 to Aug. 2013.

Geological Survey

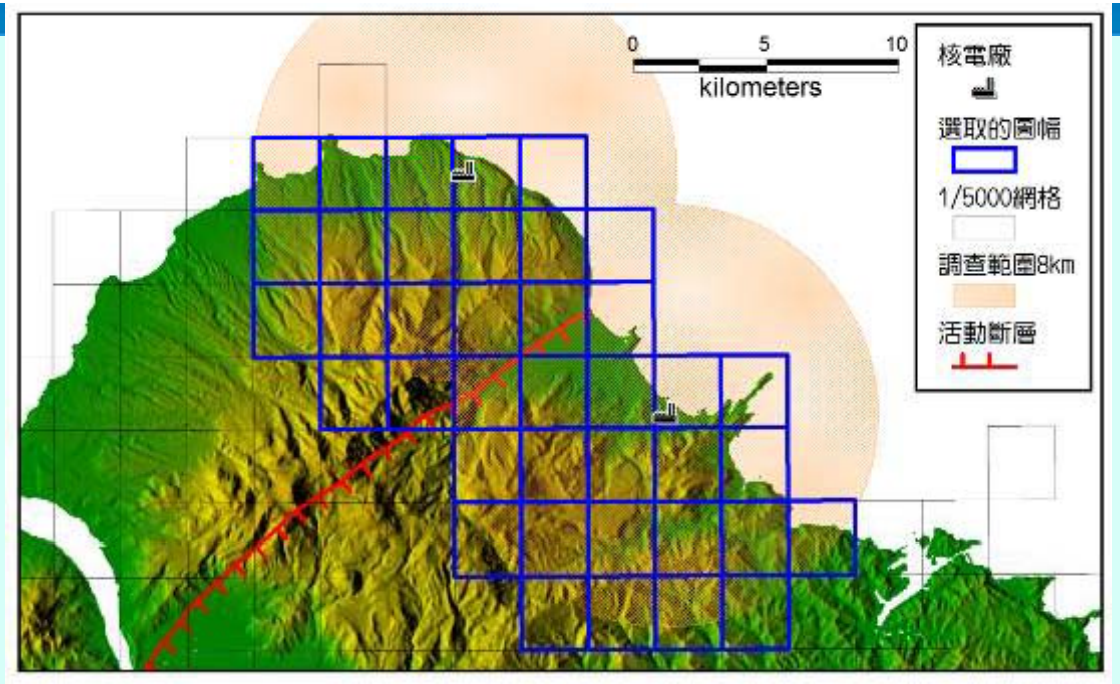
Reference：

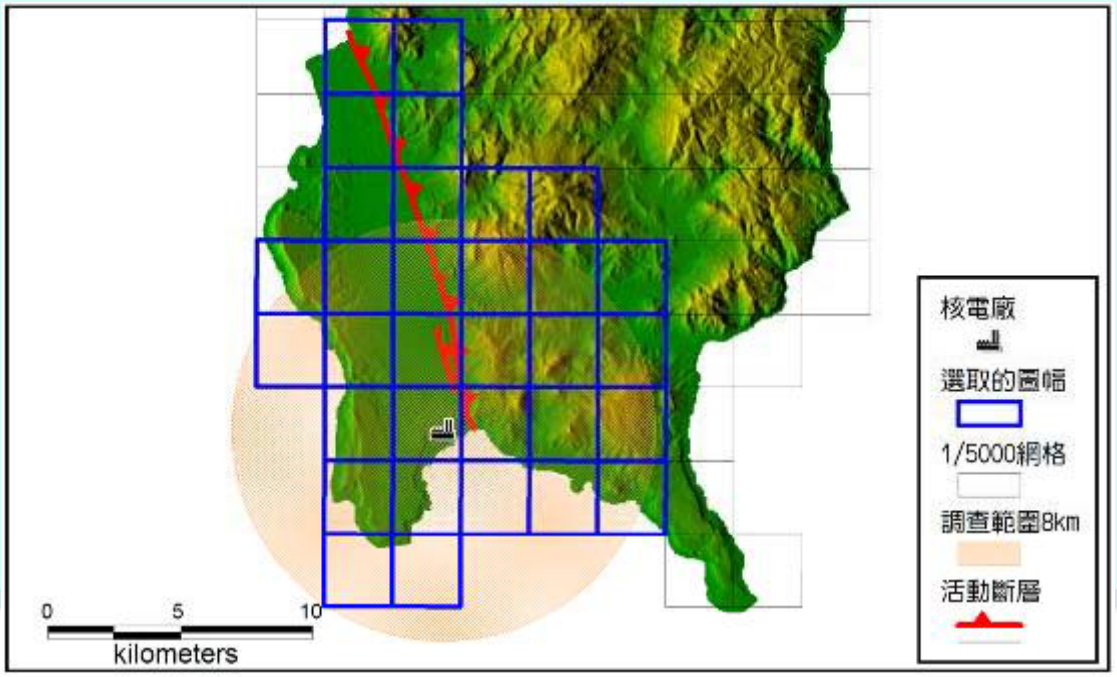
- **US：10 CFR 100 App. A, RG 1.208, RG 1.165, RG 1.132, SRP 2.5 etc.,**
- **IAEA：NS-G-3.3,**
- **Japan：「原子力発電所の地質、地盤に関する安全審査の手引」,「活断層等に関する安全審査の手引」, JEAG 4601**

Contents of Geological Survey

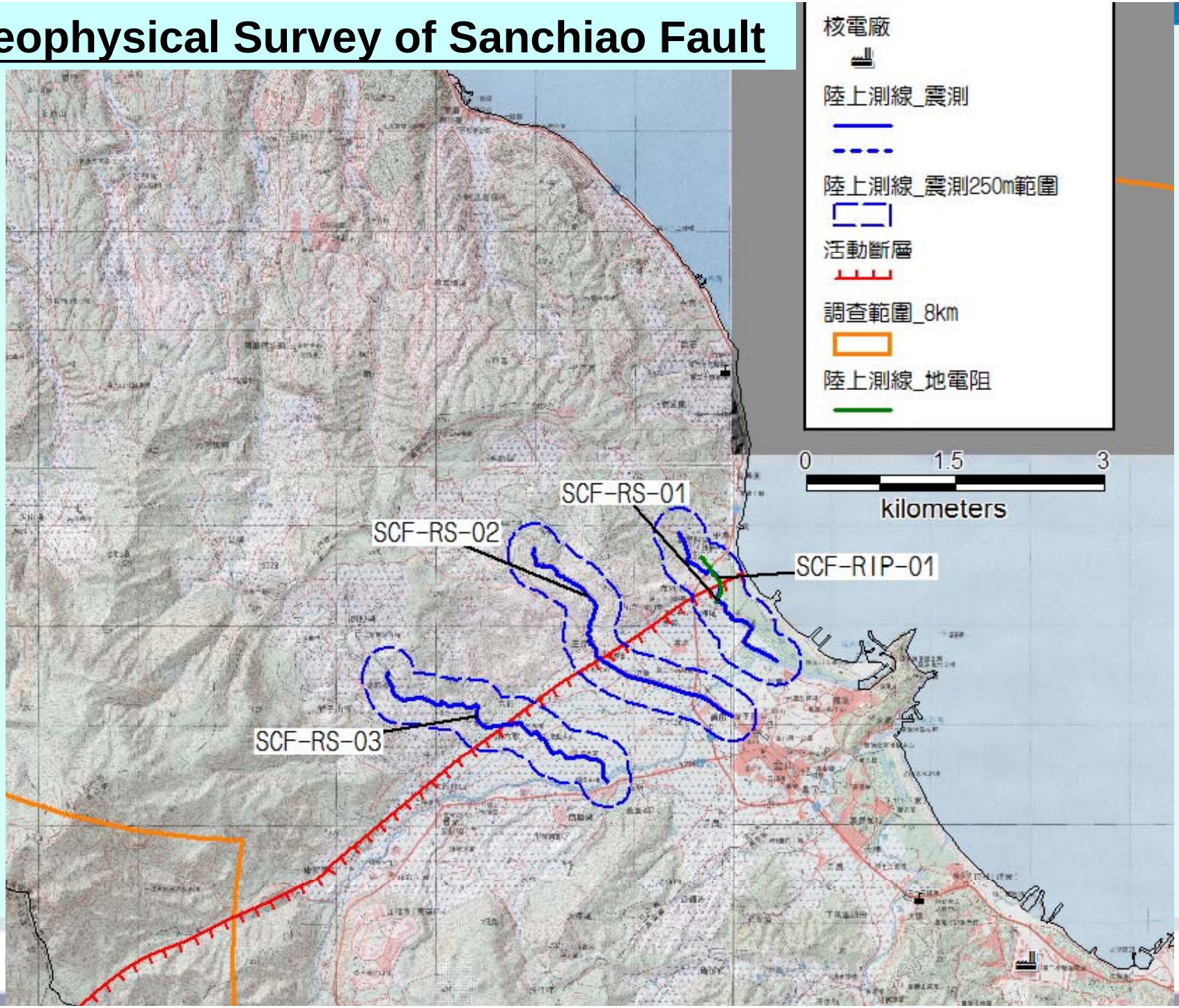
- Literature review
- Investigation of topography
- Onshore geophysical survey
- Onshore surface geological survey
- Offshore subbottom and seismic survey
- Evaluation the characteristics of faults near the sites

Boundary of Topographic Survey

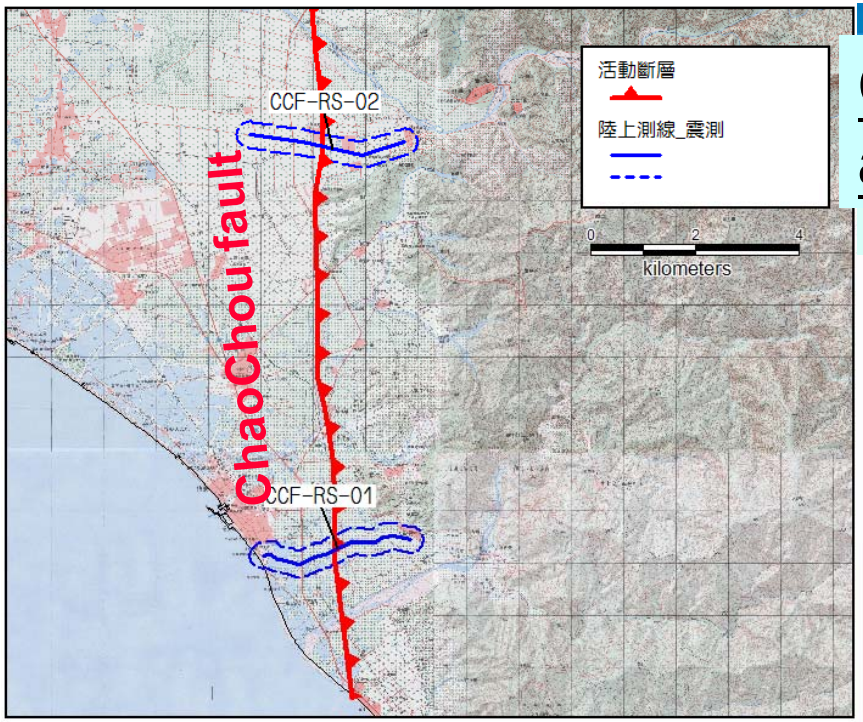


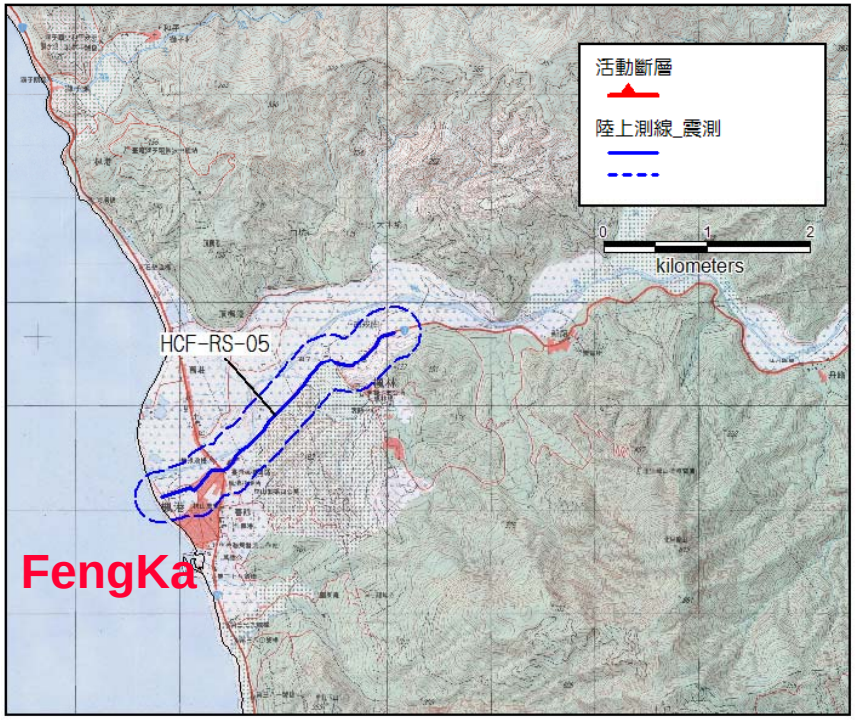


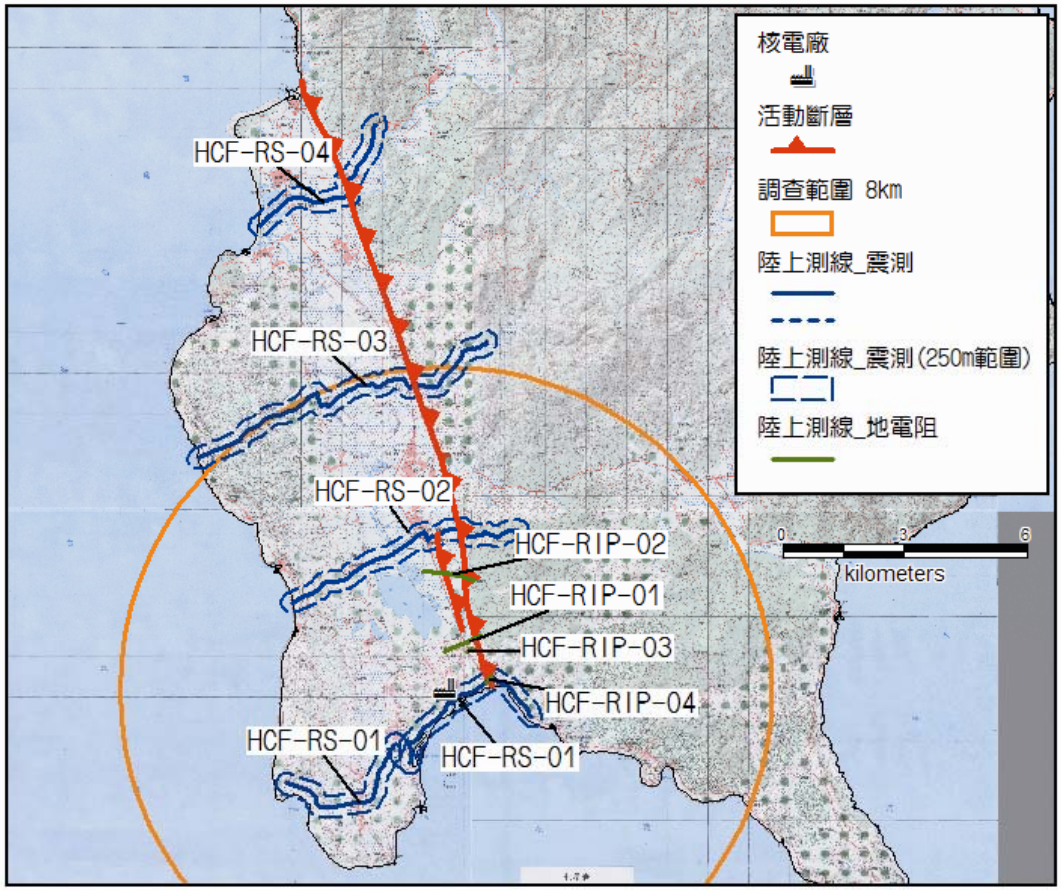
Geophysical Survey of Sanchiao Fault



Geophysical Survey of Hengchun and Chaochou Fault







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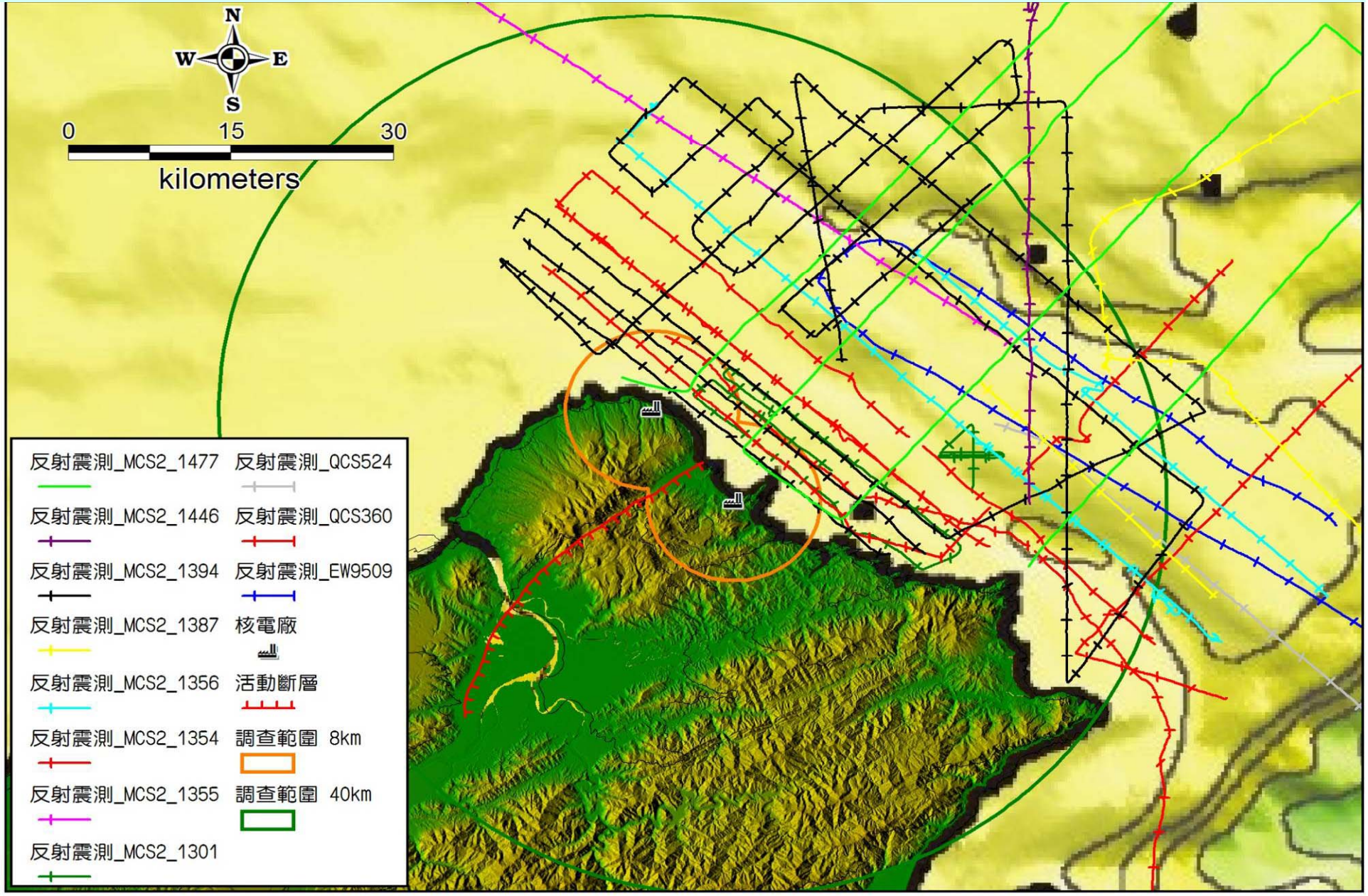
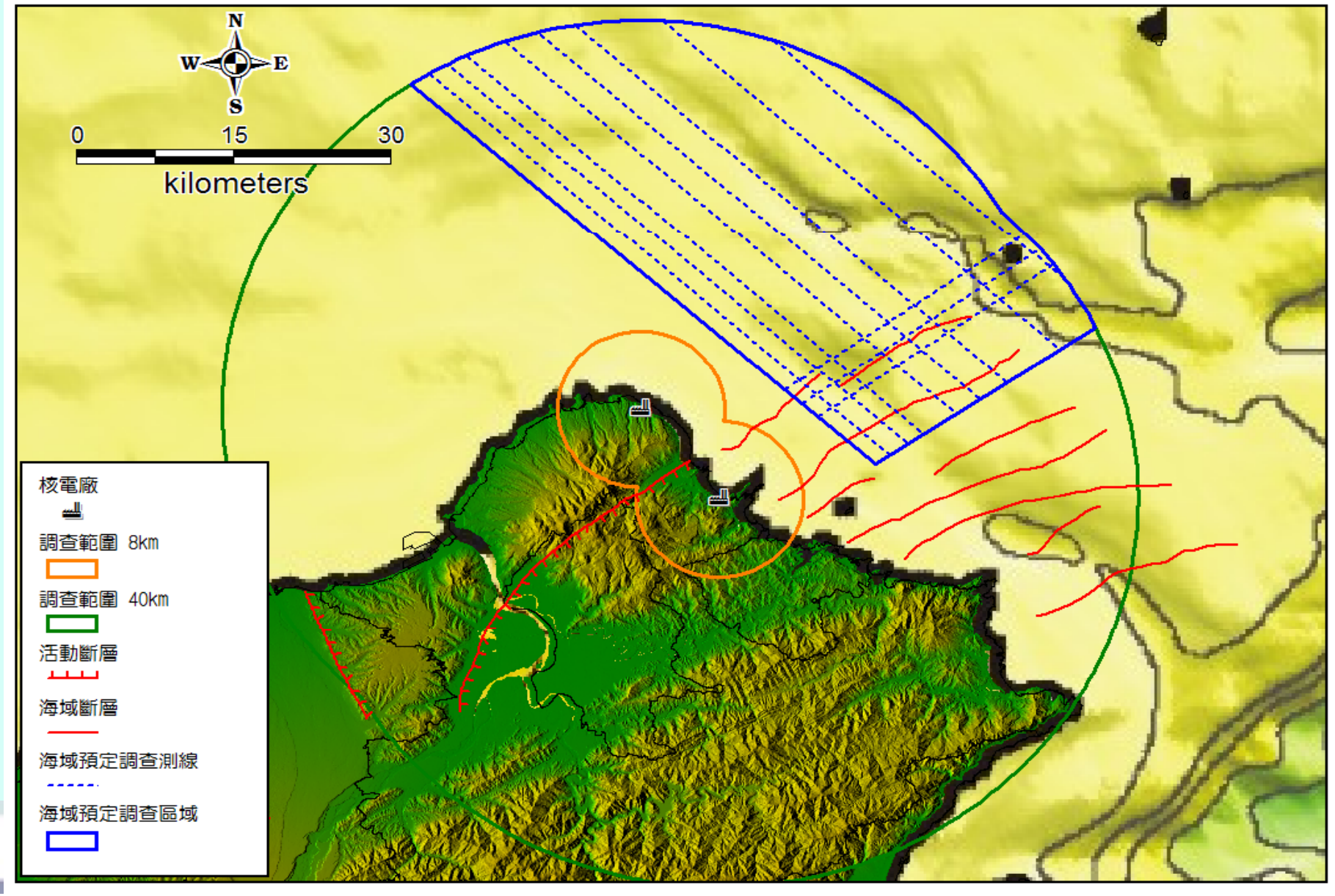
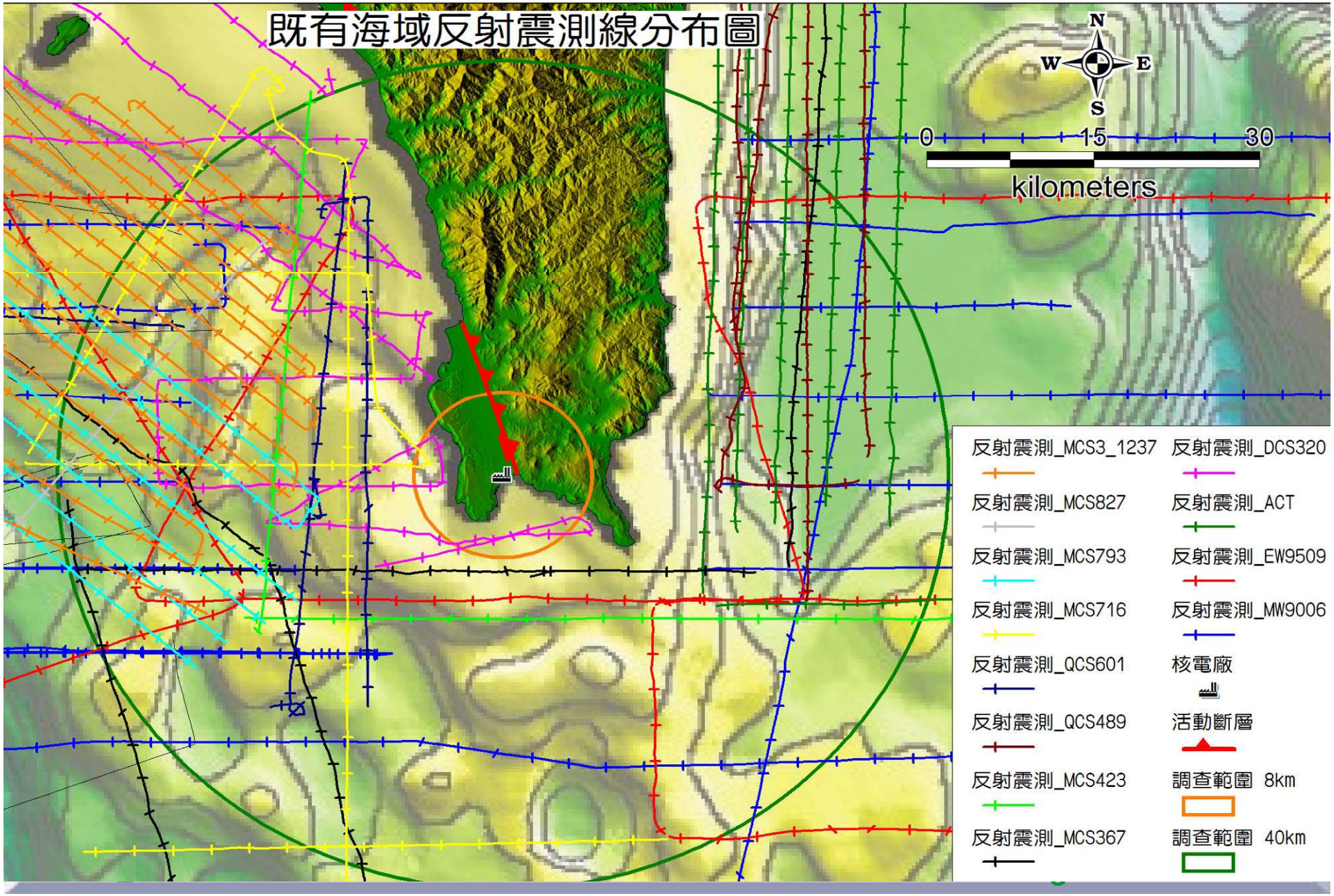
Existing Offshore Seismic Survey



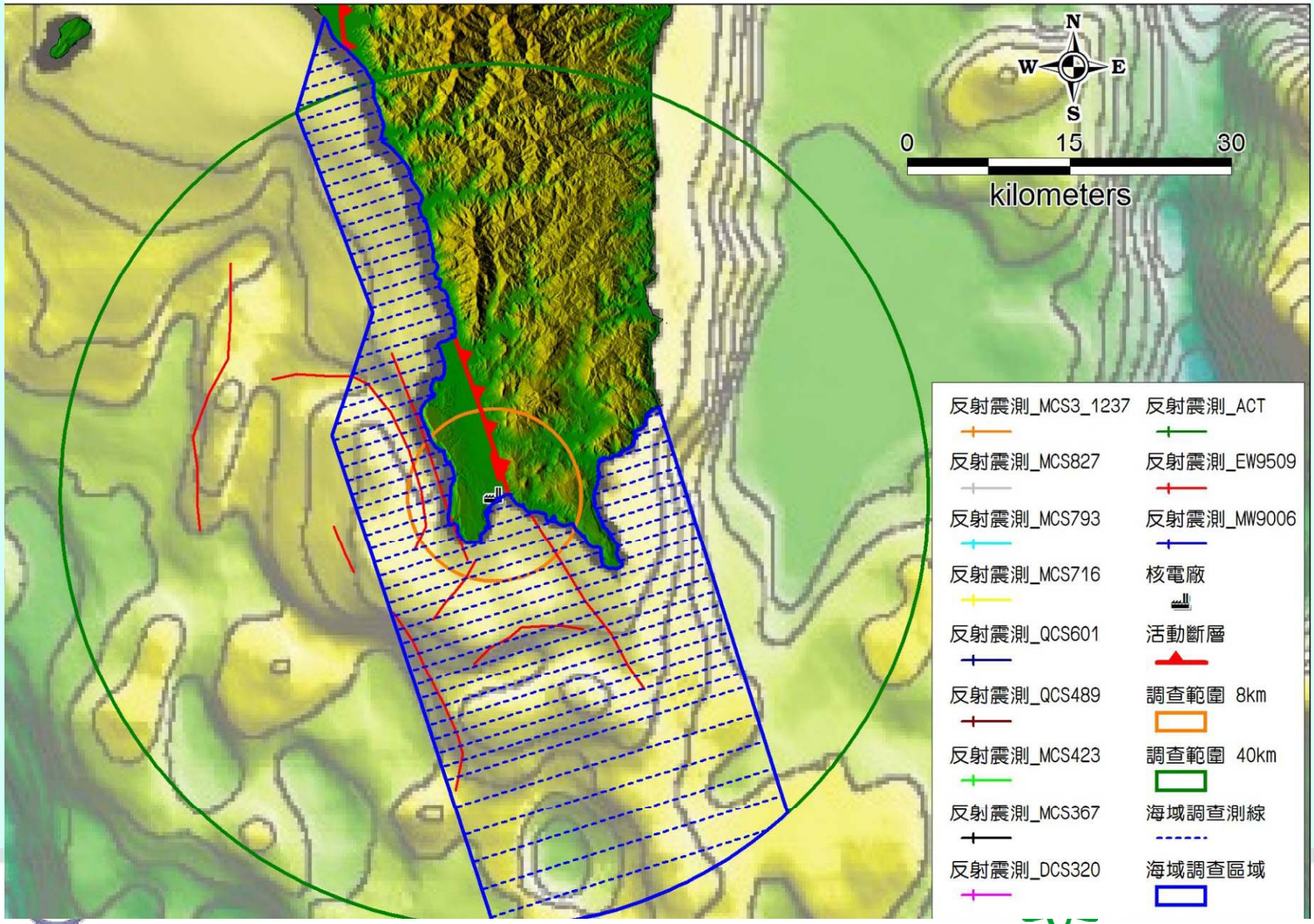
Supplement Offshore Seismic Survey



Existing Offshore Seismic Survey

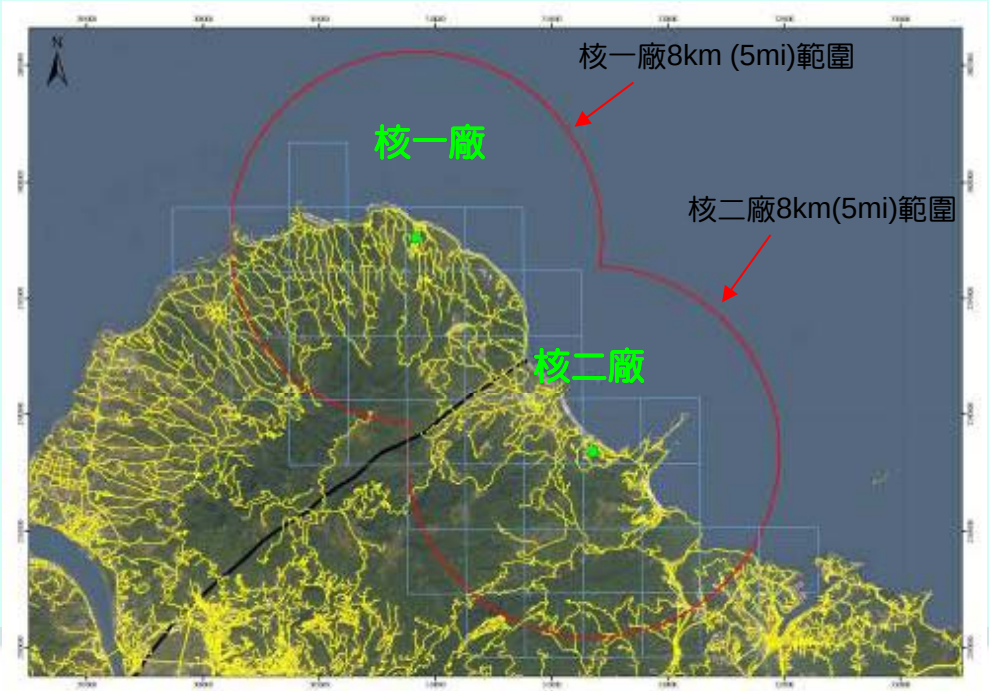


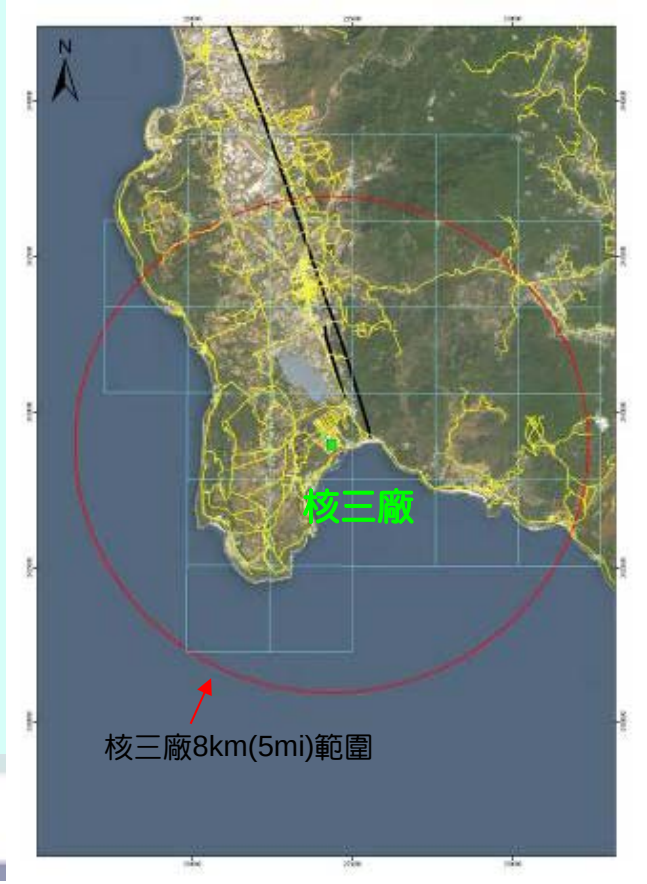
Supplement Offshore Seismic Survey



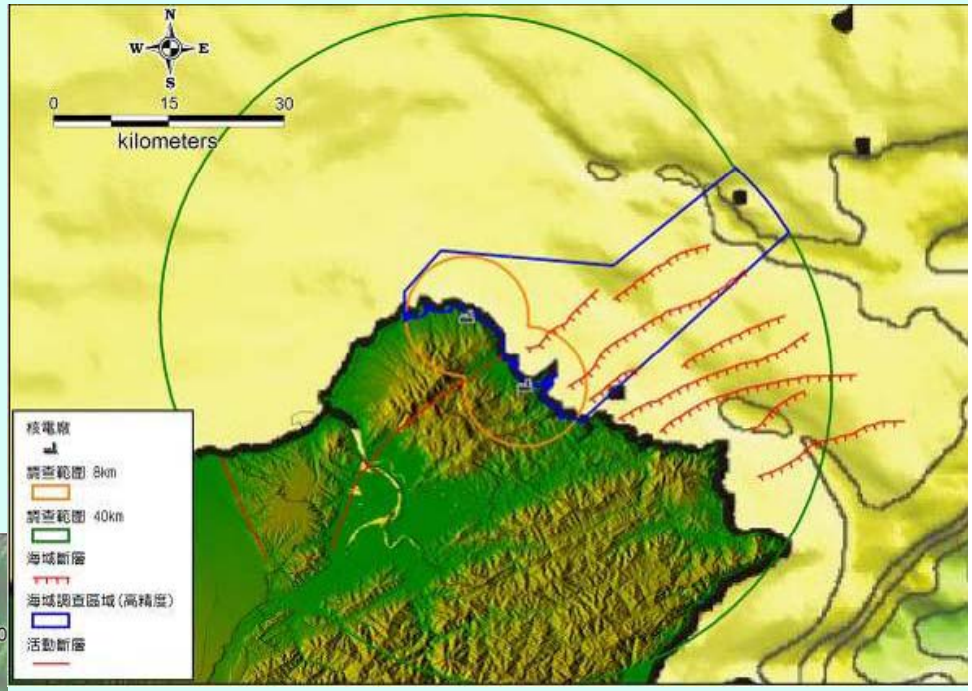
Surface Geological Survey

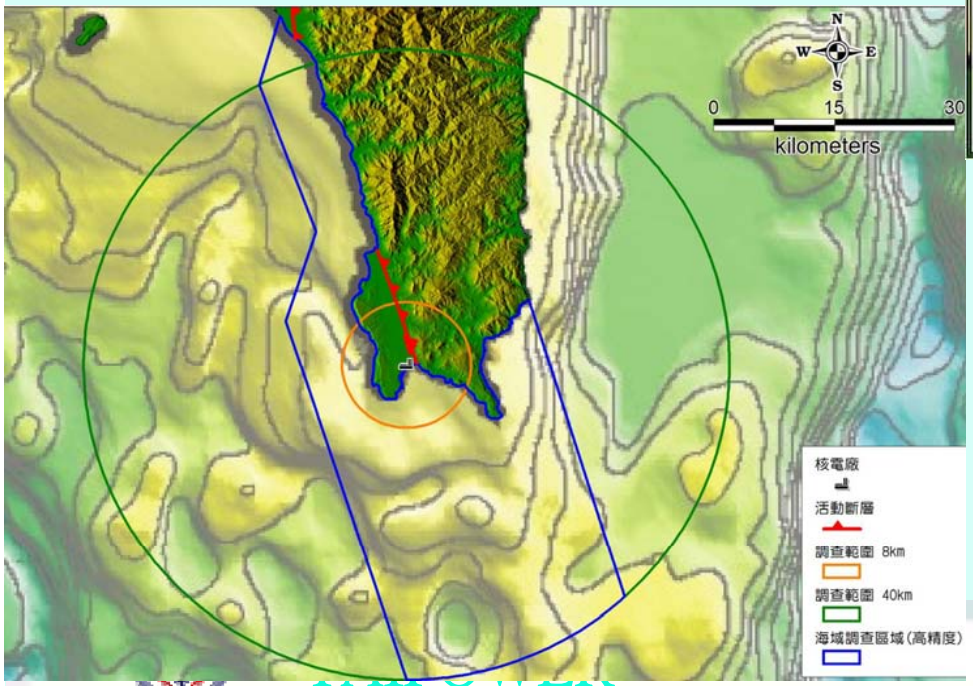
- **Surface geological survey within 8km of NPPs. (scale 1/25,000).**
- **Detail investigation along active faults (scale 1/5,000).**





Seabed Topography Survey Boundary





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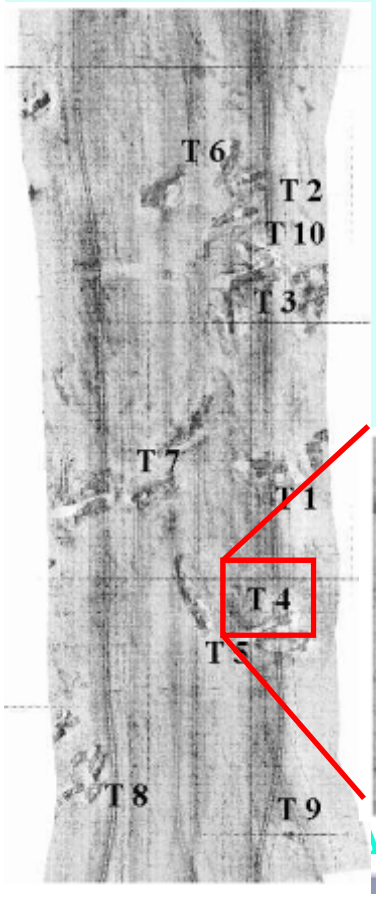
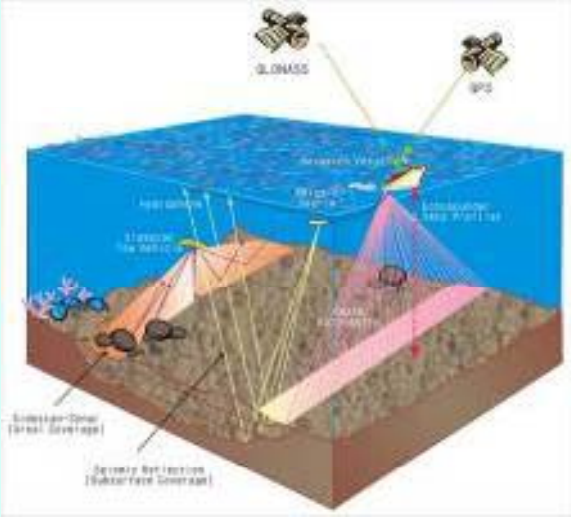
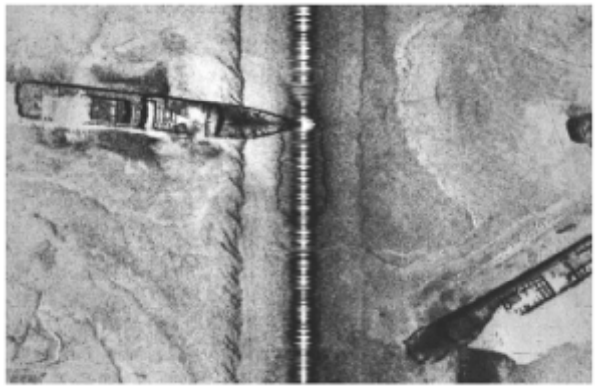
Offshore Seabed Topographic And Seismic Survey

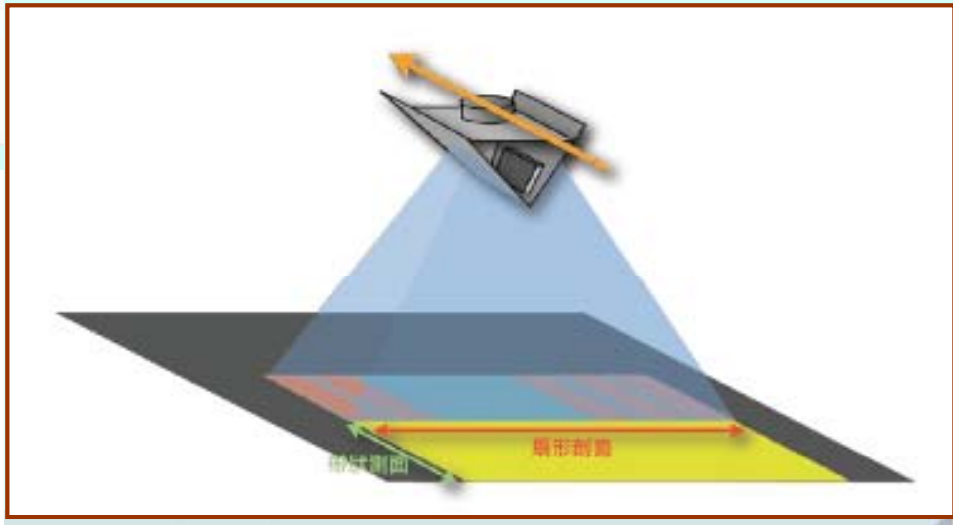
side-scan sonar





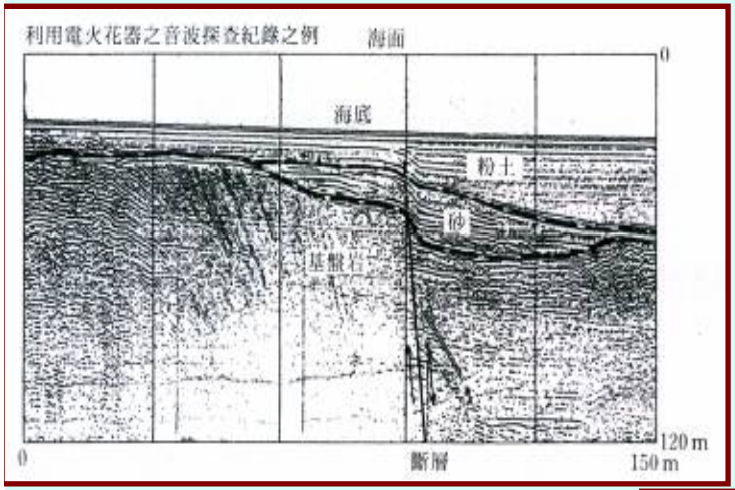


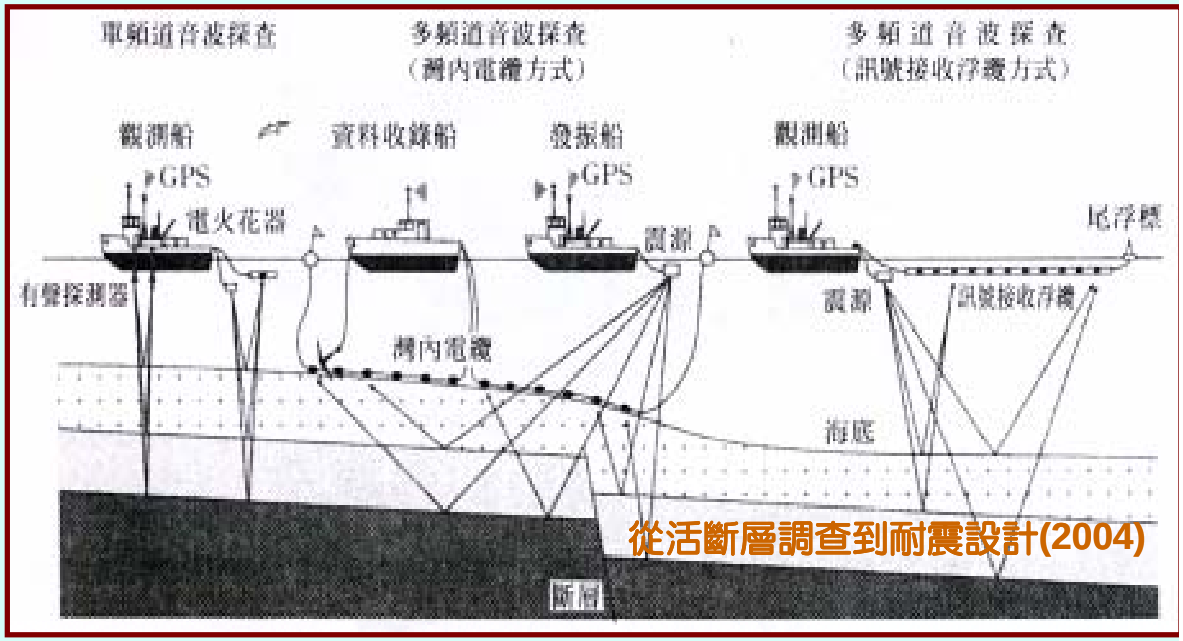
Multi-channel sonic prospecting and data processing



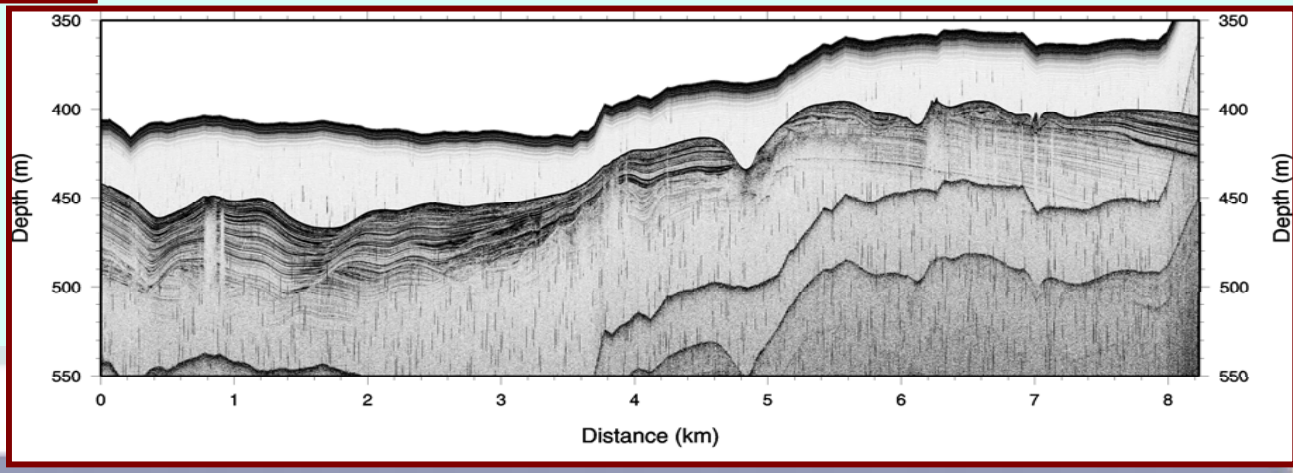
Offshore Topographic And Seismic Survey(cont.)

multi-channel sonic prospecting





sub-bottom profiler

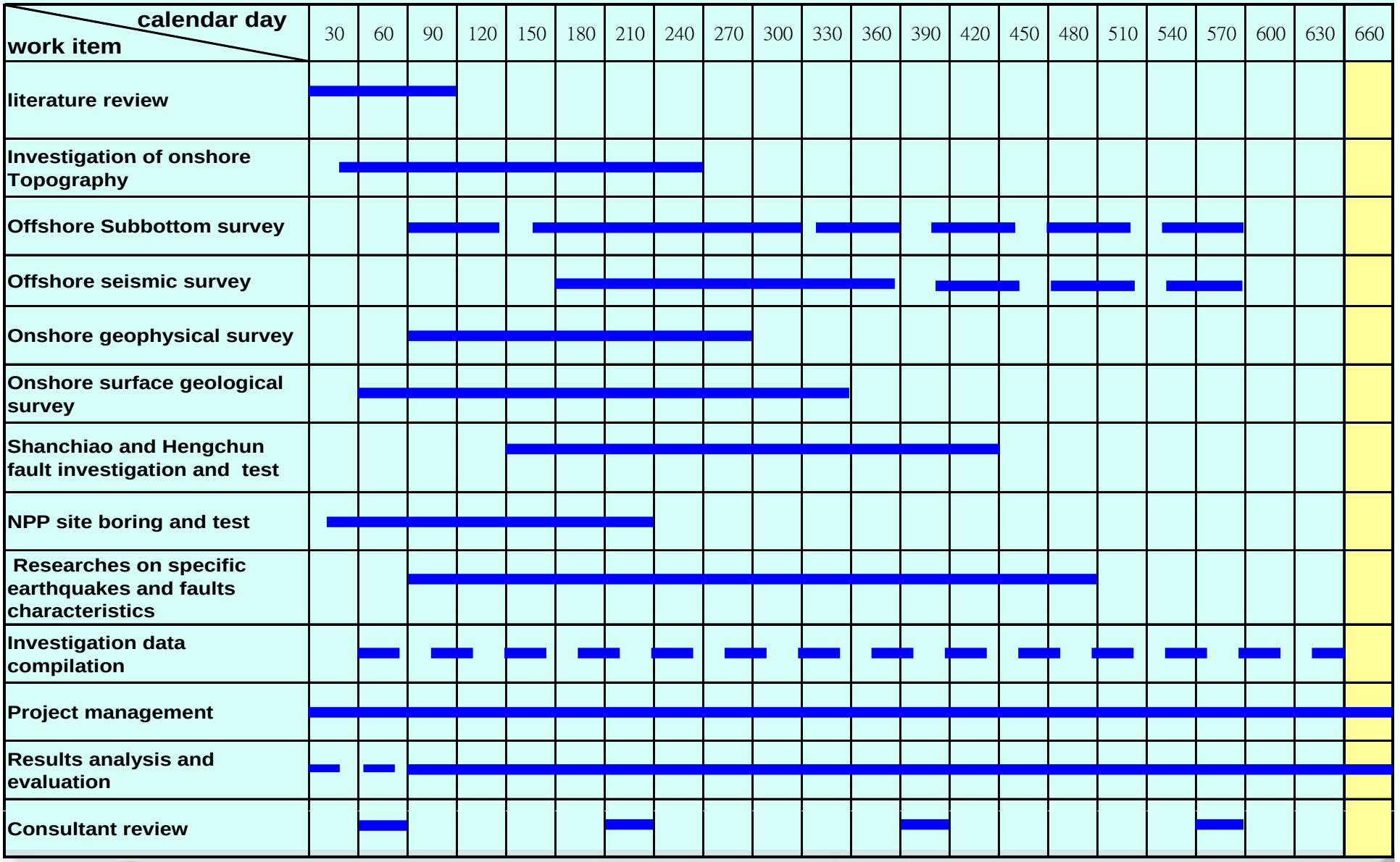


TAIPOWER

Plan of Re-evaluation of NPPs

- **Project, still under developed, will be launched after the geology investigation begins.**
- **Selection of seismic margin earthquake.**
- **Seismic margin analysis (SMA) based on EPRI NP-6041**
- **If seismic probability risk analysis (SPRA) required, SMA scaled and used for SPRA.**

Geology Investigation Schedule



Thank you
for your attention.