



# **First Time Investigation on Landslides Triggered by 12 May 2008 Wenchuan Earthquake, China**

**(12-15 June 2008)**

**Fawu Wang**

**Research Center on Landslides  
Disaster Prevention Research Institute  
Kyoto University**

**18 June 2008**

# 中国活动构造图

比例尺 1:4000000



国家基础地质研究所编 (1971) 1:400万  
《编号: 200403013400》地质图

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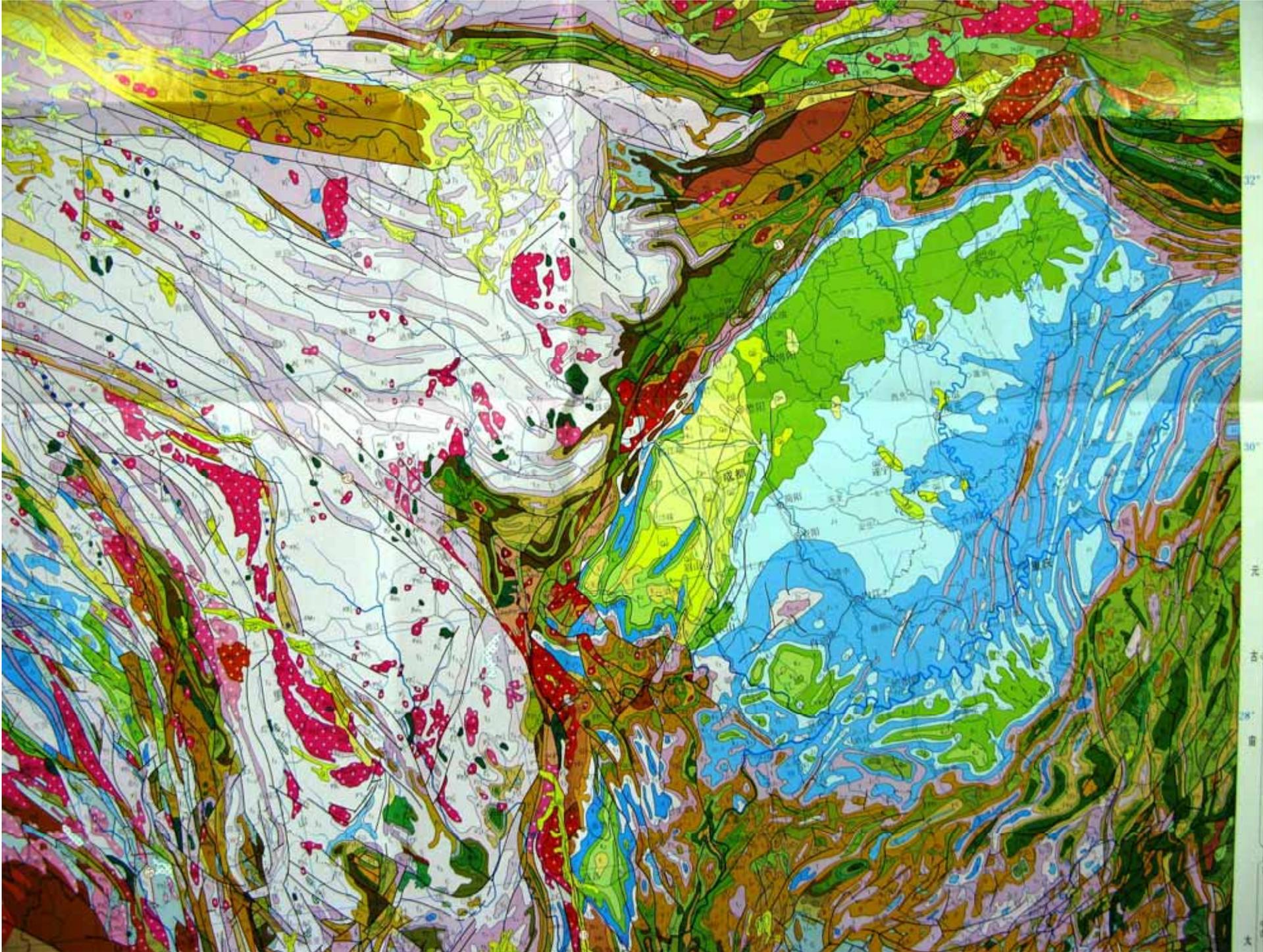
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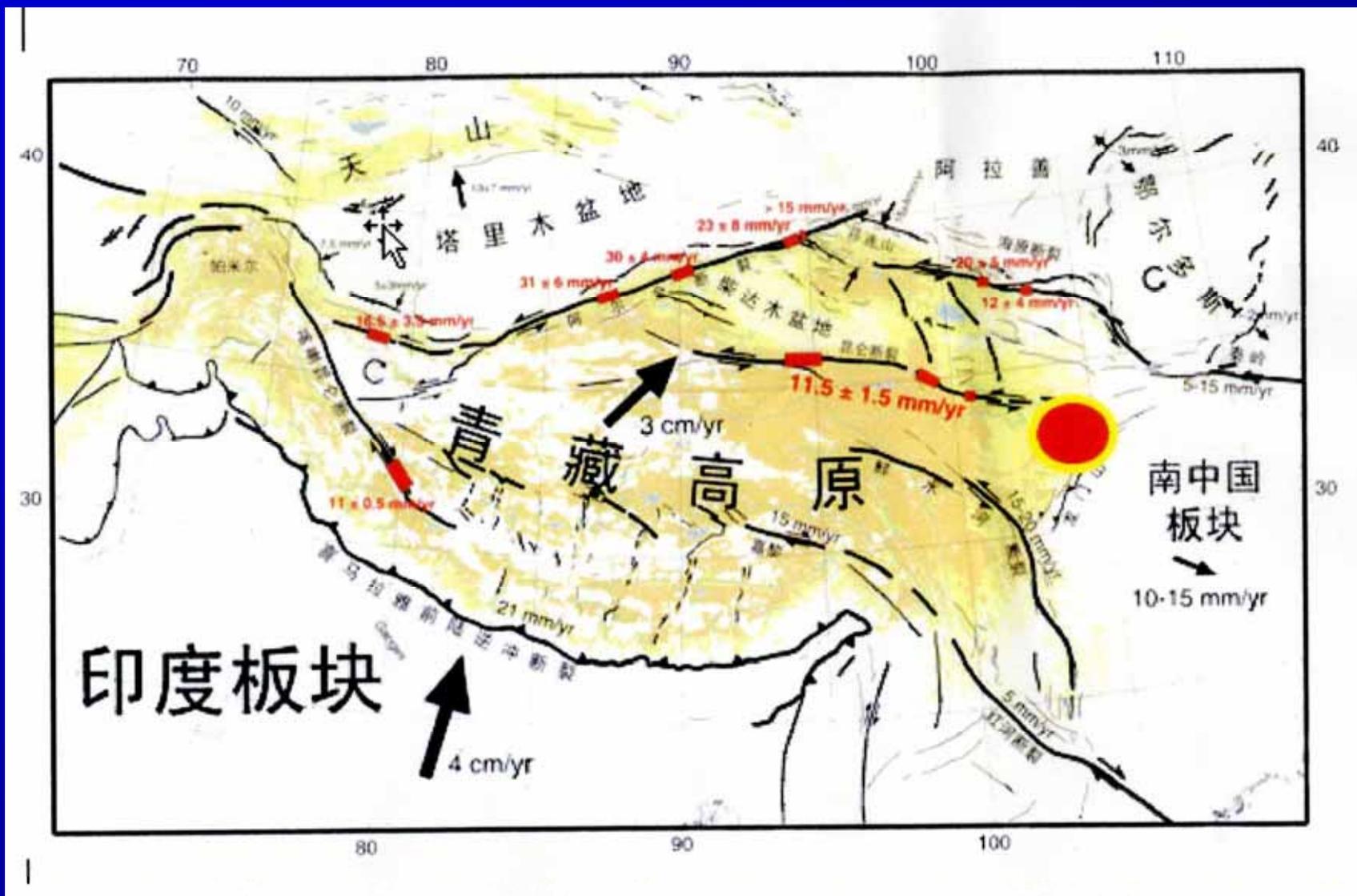
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1:400万地质图 1幅

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From: website of China Geological Survey

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汶川

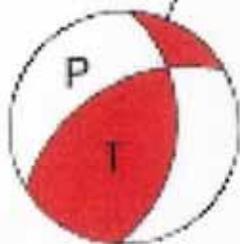
龙门山

四川盆地

汶川-茂汶断裂

北川-映秀断裂

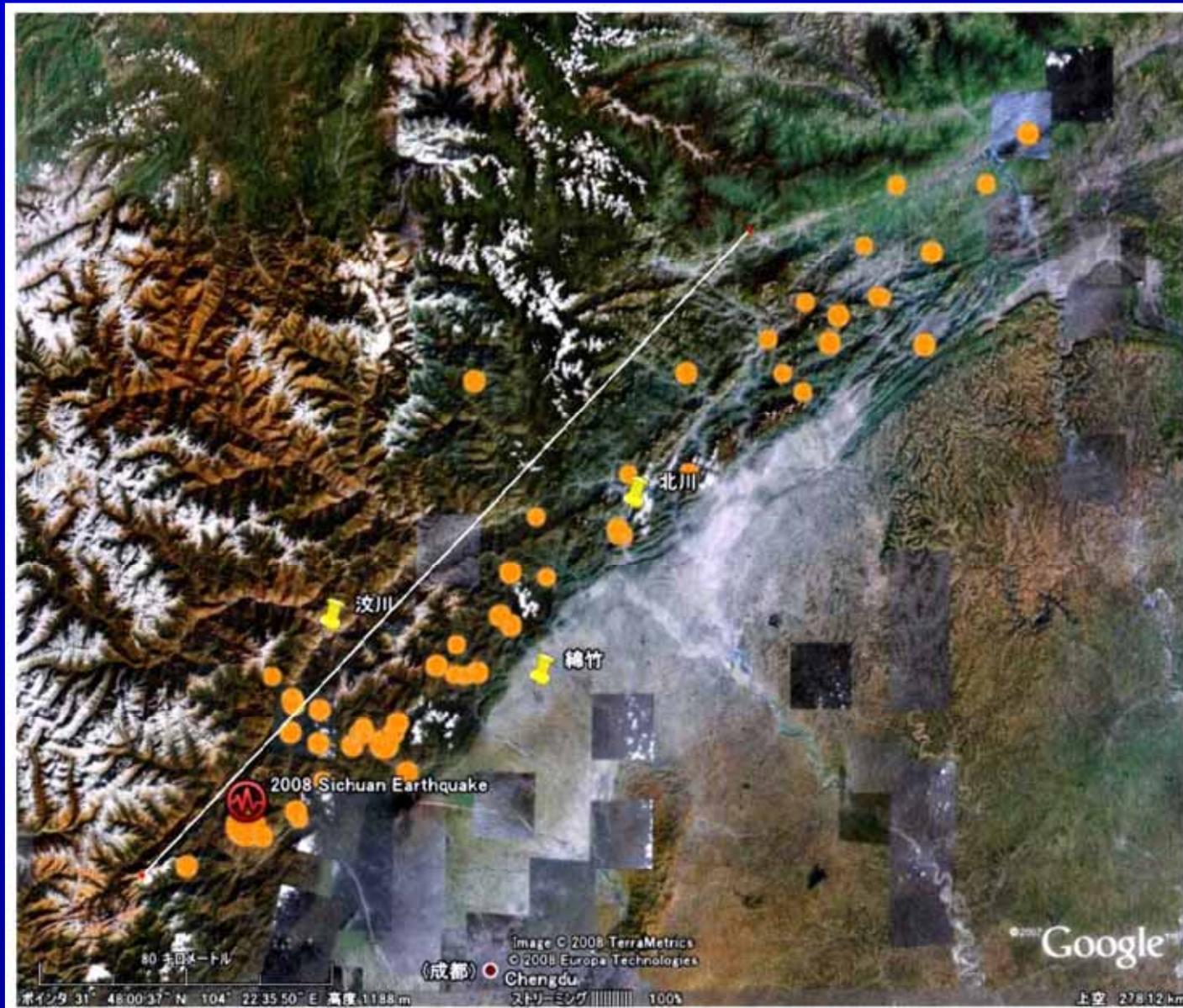
安县-灌县断裂



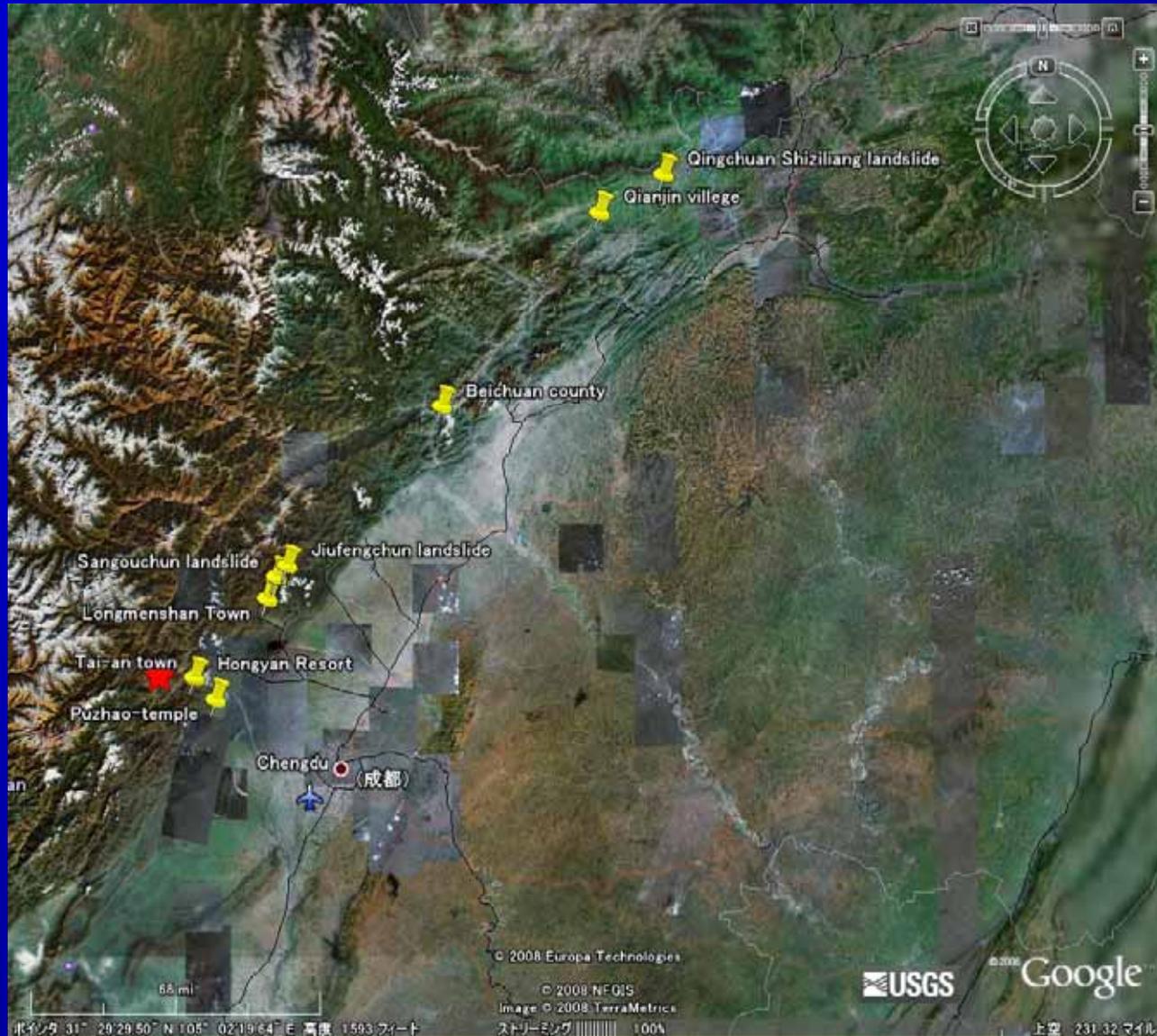
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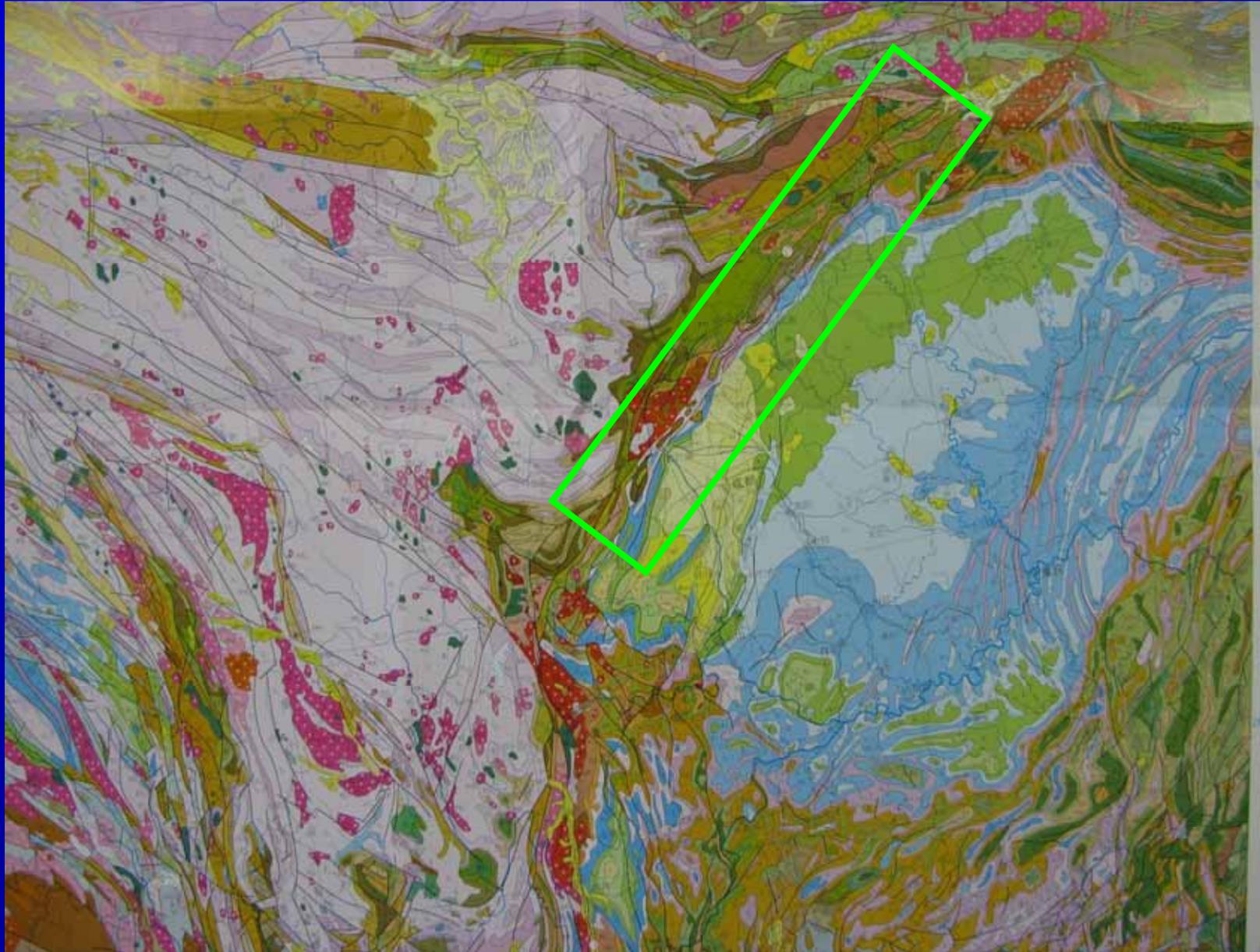
# Epicenter and aftershock (USGS)



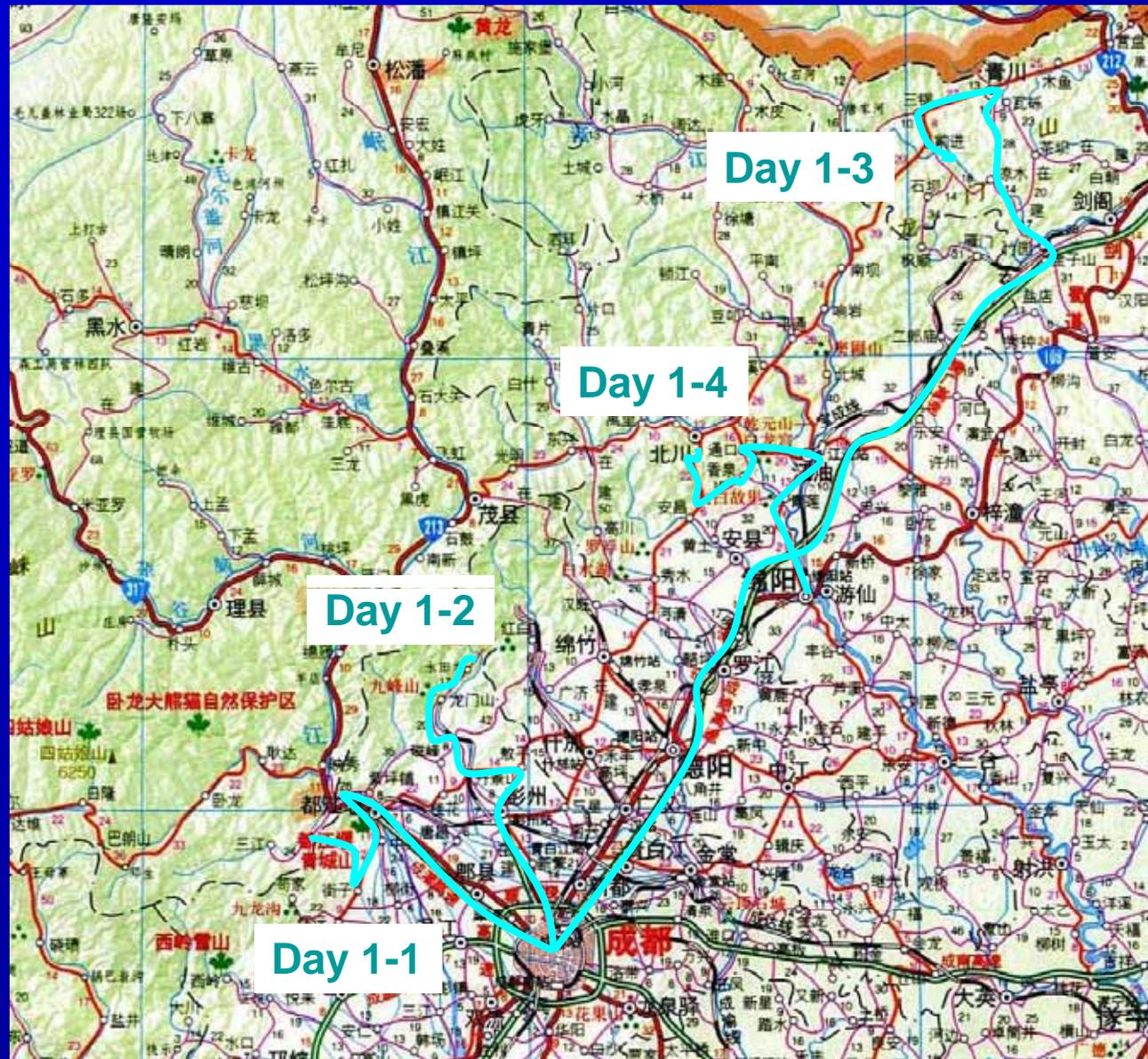
# Landslide points in our investigations



# Geological map



# Routes of the 4-day investigations



# Investigation schedule

- **12 June (Day 1-1)**  
Chengdu – Dujiangyan – Mt. Qingchenghoushan  
(Hongyan resort)
- **13 June (Day 1-2)**  
Chengdu – Longmenshan – Yinchanggou resort
- **14 June (Day 1-3)**  
Chengdu – Qingchuan – Mianyang
- **15 June (Day 1-4)**  
Mianyang – Beichuan – Chengdu

# The participants of the investigation



**From left:**

**Dr. C.G. Yan: Kanazawa Univ., Japan / Changan Univ., China**

**Prof. M. Miyajima: Kanazawa University, Japan**

**Prof. Q.G. Cheng: Southwest Jiaotong University, China**

**Ass. Prof. F.W. Wang: Kyoto University, Japan**

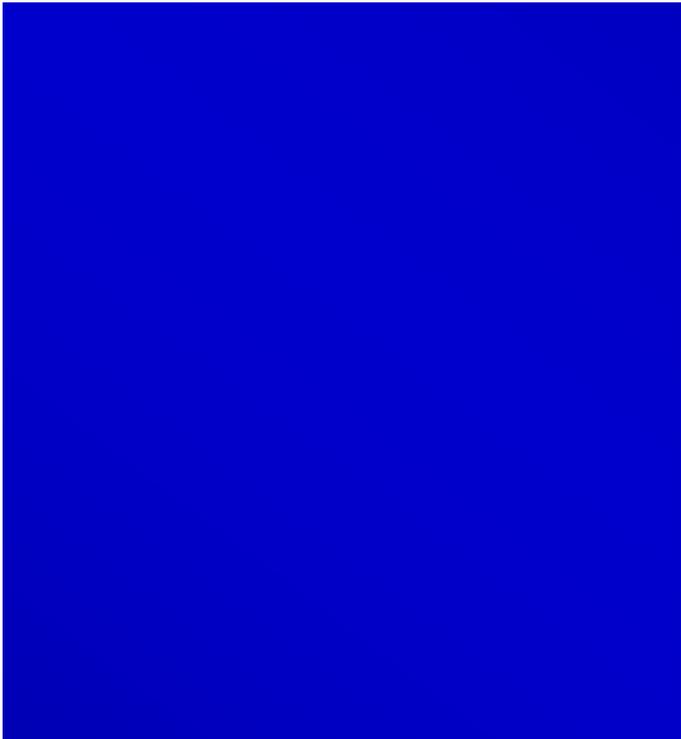
# Content in Day 1-1

- Building failure in Puzhao Temple (普照寺)
- Shallow landslide caused damage of a tea shop in Tai-an Town (泰安鎮)
- Large area shallow landslide as a part of failure of a giant ancient landslide which dammed the river in Hongyan Resort (紅岩村)

# Building failure in Puzhao Temple (普照寺)



Tilted temple name



**Damaged situation  
in the temple**

**No life loss in this temple**

**Reparation work  
in the temple**



**The fallen head of the  
statue was relocated.**



**Damaged pipe**



**No damage in the  
old tower**

**Sled roof**



**X cracks in the wall**

# Shallow landslide caused collapse of a tea shop in Tai-an Town (泰安鎮)



About 4 persons were buried at the landslide toe.

**The ridge tiles were shaken down.**



**The landslide reached the center of the stream.**

# Front view of the Tai-an Town landslide



# Large area shallow landslide as a part of failure of a giant ancient landslide which dammed the river in Hongyan Resort





**47 tourists from Chengdu and 4 local people were buried by the landslide, when they walked along the road.**



**Shallow landslides occurred at the both sides of the stream.**



**Shallow failures also occurred around the small tree in the center of the photo when we investigated this site.**



**The stream passes through a ancient landslide. It is estimated that the ancient landslide has dammed the river. In this event, shallow landslide occurred in the cut.**

# Landslide paradise



The Chinese characters means paradise.

Houses damaged in the Hongyan Resort. Actually, all of the resort was built on the ancient landslide. It is unusual to find such wide open area in the mountains.



The young man was pulled out from a damaged house. His finger and head was injured.



The local people told us the story when the earthquake occurred. They hope government can guide their rebuilding to avoid further damages.

**This step was shown in the video taken by a Peruvian tourist. The video was broadcasted by NHK for many times.**



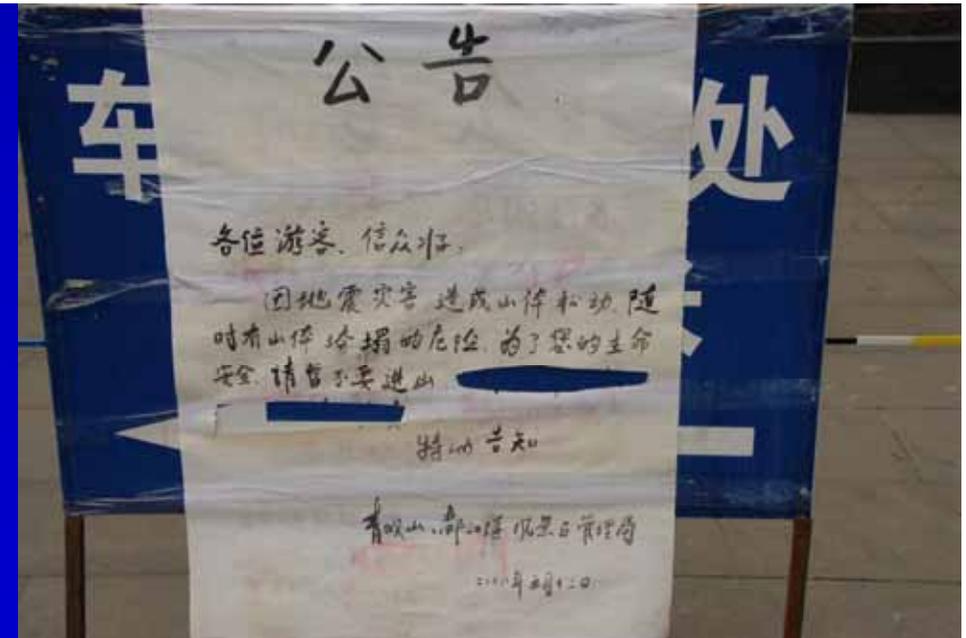
**The Peruvian tourist left his tent to local people.**



**Debris flow came from the rock slide after a post-earthquake rainfall. We asked the local people pay attention to the rockslide in rainy days.**



**A rockslide occurred behind the Hongyan Resort.**



**Mt. Qingchengshan, a world cultural heritage was closed to prevent landslide disaster.**



# Content in Day 1-2

- Bridge failure near Longmenshan (龍門山)
- Large shallow landslide in Sangouchun village (三溝村)
- Large scale landslide in Jiufengchun (九峰村)
- Slope failure in Yinchanggou Resort (銀場溝)

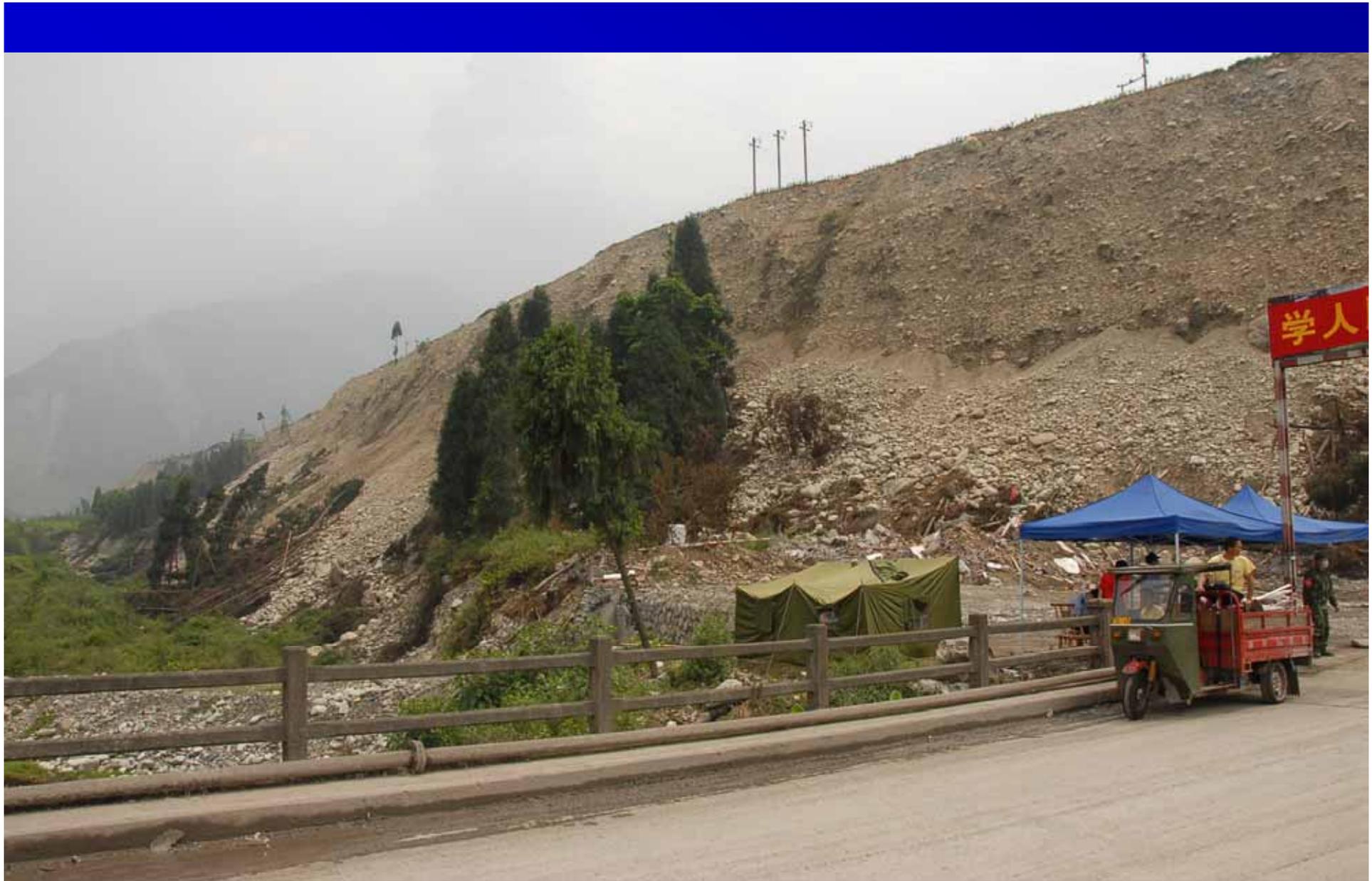
# Bridge failure near Longmenshan (龍門山)



**The damage of the bridge cut the access to Longmenshan Town. The active fault was named after the town.**



**The big stone jammed the road completely.**



**Shallow failure occurred along the steep terrace.**

# Large shallow landslide in Sangouchun village (三沟村)



4 young men working on a house roof, and an old woman were buried by the landslide. They had no time to escape.

Stream to Longmenshan Town



**Another house at the right side of the landslide**



**Another house at the left side of the landslide**



**Lunch served by local people  
(rice, potato and noodle )**

**Asking questions to  
the pupils.**

**They were quite  
willing to answer.**



# Large scale landslide in Jiufengchun (九峰村)



**A lake formed by the Jiufengchun landslide. The bridge was damaged by the earthquake.**

# The Jiufengchun landslide



The local people said, the landslide was formed in only one minute. They thought the debris should come from the ground, because it was formed so sudden.

More than 60 persons from 17 families, and more than 30 tourists were buried by the debris.



**From the middle looking to the source area, it is estimated that the distance to the failure in the source area is more than 1km.**



**The granite debris is quite dry. However, water was found in the middle of the debris.**

**It is estimated that the slide zone can be saturated by the water. For this reason, the landslide travelled rapidly for long distance.**



**The landslide toe dammed the stream partially. If the earthquake occurred in rainy season, the stream should have been fully dammed.**



**Situation at the landslide toe**



**View from the toe to the source area of the landslide**



**The boundary was quite dry. Wracks of the houses can be seen.**

# Slope failure in Yinchanggou Resort (銀場溝)



**Shallow slides cut the access to the mountain at the bridge.**



**Shallow landslide partially dammed the stream from Yinchanggou to Longmenshan Town.**



**Bridge across the stream from Yinchanggou to Longmenshan  
Town collapsed .**



**The small dam was safe in the earthquake.**



**Thrust fault cutting the road from Yinchanggou to  
Longmenshan Town**

# Content in Day 1-3

- Shiziliang landslide (獅子梁) in Qingchuan County (青川)
- Landslide lake in Qianjin village (前進鄉)

# Shiziliang landslide in Qingchuan County



**There is a long continuous crack in the top of the mountain, threatening large part of the Qingchuan County.**

# The cracks



# Looking down to the City from the crack



Blue roofs are rescue tents.

# Landslide lake in Qianjin Village

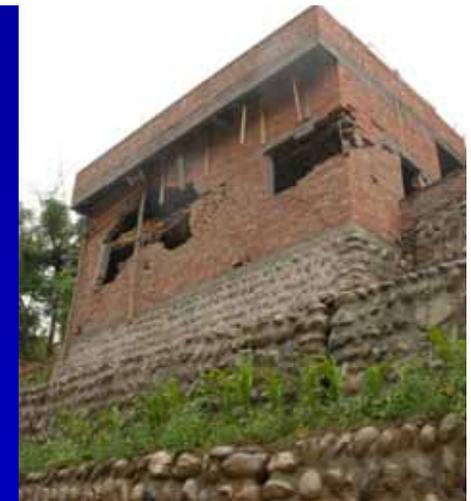


The lake was formed by Hongguang Village landslide

# Landslide lake in Qianjin Village



**The lake**



**Damaged under-construction building**



**Disappeared road to the lake**

# Landslide lake



(From China Geological Survey)

# Content in Day 1-4

- **Damage to Libai's ceremony house in Qinglian Town(青蓮), Jiangyou City (江油市)**
- **Landslides and active fault in Beichuan County (北川縣)**



**This small town is famous for the poet, Li Tai-po.**



**The Valhalla for the most famous poet, Li Tai-po, in Qinglian Town, Jiangyou City**



**Light damages in the main building**



**One of the two memorial  
stones tilted.**

**The tilted one was written  
by Mr. Deng Xiaoping.**



**Roof damages in the  
old building.**





The wall fell down and hit the young poet statue's head

No damage to the old poet statue





**The large tower in Qinglian Town**

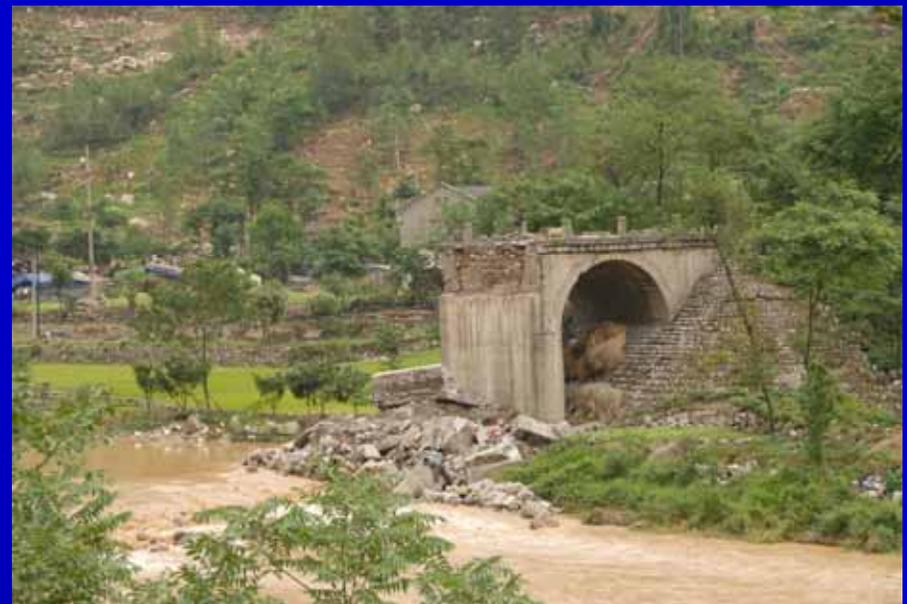


**Damage in the simple fence**



**Damaged bridge**

**Shallow slides along the river  
from Beichuan**



# The boundary of Beichuan County





**Landslides and building collapse become severe in Beichuan County.**





**Shallow landslide**



**Deposit fan of debris flow**

# Giant rockfall at Leigu Town





**The lady survived from a rapid landslide (marked by circle). Only two survivors from the landslide.**



# The Destroyed Beichuan County



The left slide is Wangjiayan slide, while the right one is Jingjiashan slide.

# The Wangjiayan slide



**This slide occurred in weathered mudstone. It destroyed the county services including Education Bureau, Public Safety Bureau, a jail, a hospital, a kindergarten, and so on. Almost no body survived from this slide.**

# The Wangjiayan slide



**The sliding mass of the Wangjiaya slide is almost flat. It is a rapid and long-travel landslide.**

# Another view with two slides



# The Jingjiashan slide



**The Jingjiashan slide occurred in weathered limestone. It destroyed two schools at its toe. The young survived from the slide when he jumped out of a motorbike.**

# The damaged bridge in the Center of Beichuan County



# Strict prohibition for entering



# The active fault behind the gate of Beichuan County



Originally, the house was at the same level as the road. The height of one floor is about 3m, so the uplift of the fault in this position is estimated around 4m.

# The active fault behind the gate of Beichuan County



# The active fault behind the gate of Beichuan County



The same fault crossed the road in the up branch.

## Only helicopter can pass Beichuan County



Everybody comes  
out of the gate of  
Beichuan County  
should accept  
disinfection.

# **My impression on the landslide triggered by Wenchuan Earthquake**

- **Lots of shallow slides.**
- **Most of the slides were rapid. Rapid and long-travel landslides occurred in mudstone, shale, limestone, granite.**
- **Because the earthquake is so strong, the difference by strata is not clear.**
- **The landslide disasters caused by the combination of strong earthquake motion, steep geomorphological condition, and fragile strata (by weathering and active faults).**
- **It will be extremely worse if the earthquake occurs in rainy season.**

**Some other photos**



**The isolated dogs by the damaged bridge**





**Endless rescue tents**



**Japanese tents**



**Endless rescue trucks**



**UNHCR tents**

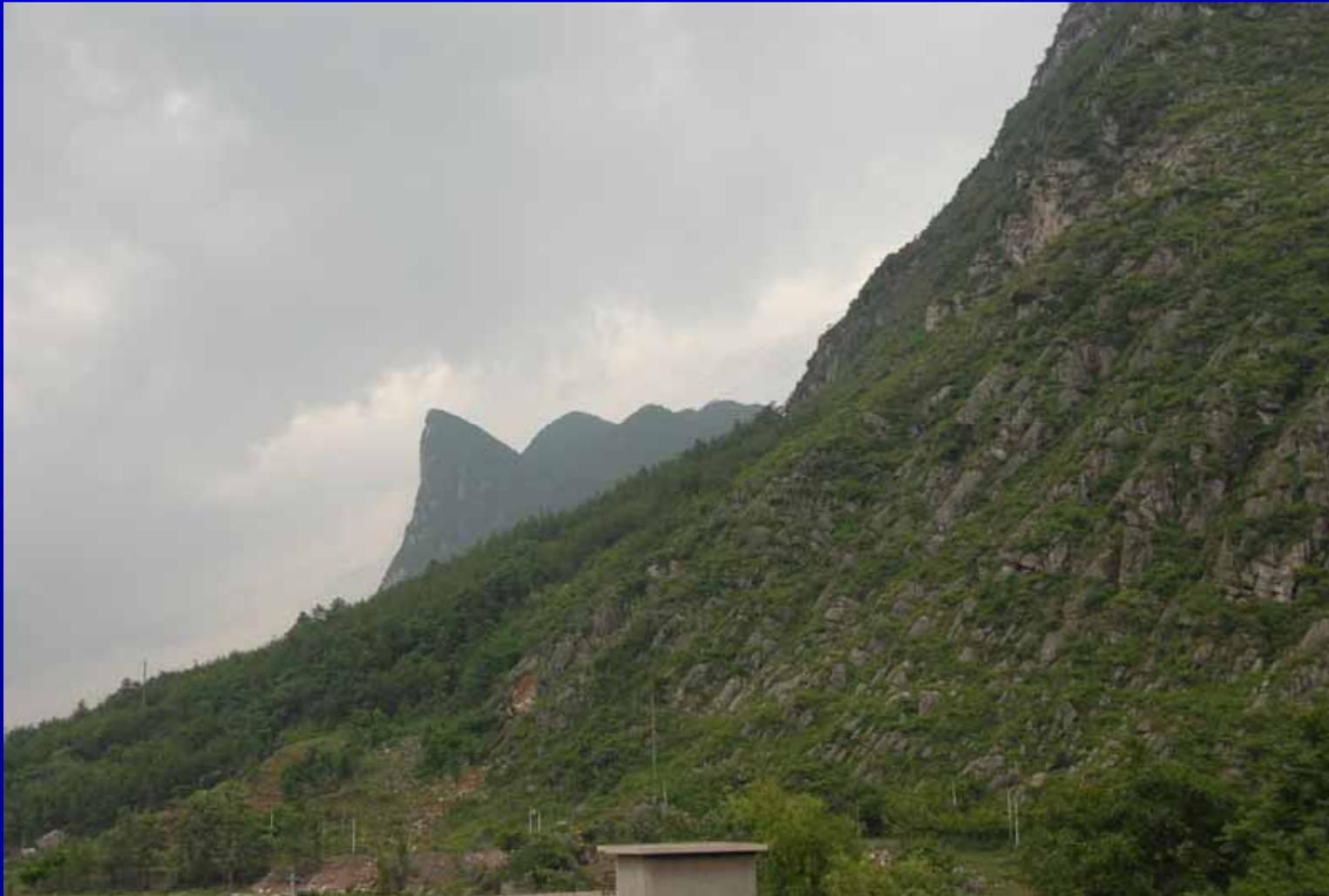
**Endless rescue houses**





**Damaged cars**

**Geologist, do you know what will  
happen next time?**



**The earthquake is nothing for us!**

