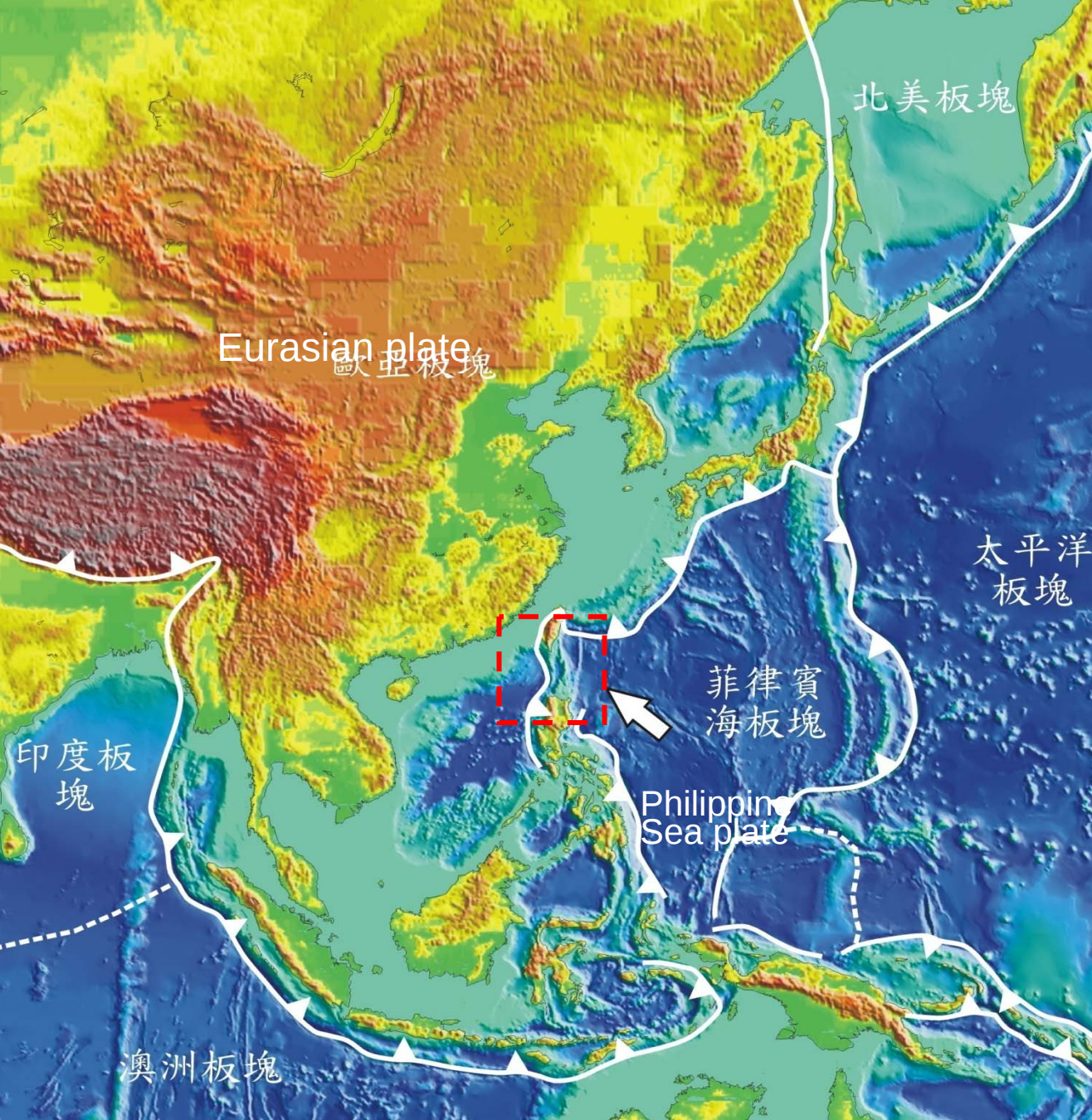


Soil Information System of Taiwan Soils and Its Applications



Horng-Yuh GUO and Zueng-Sang CHEN *

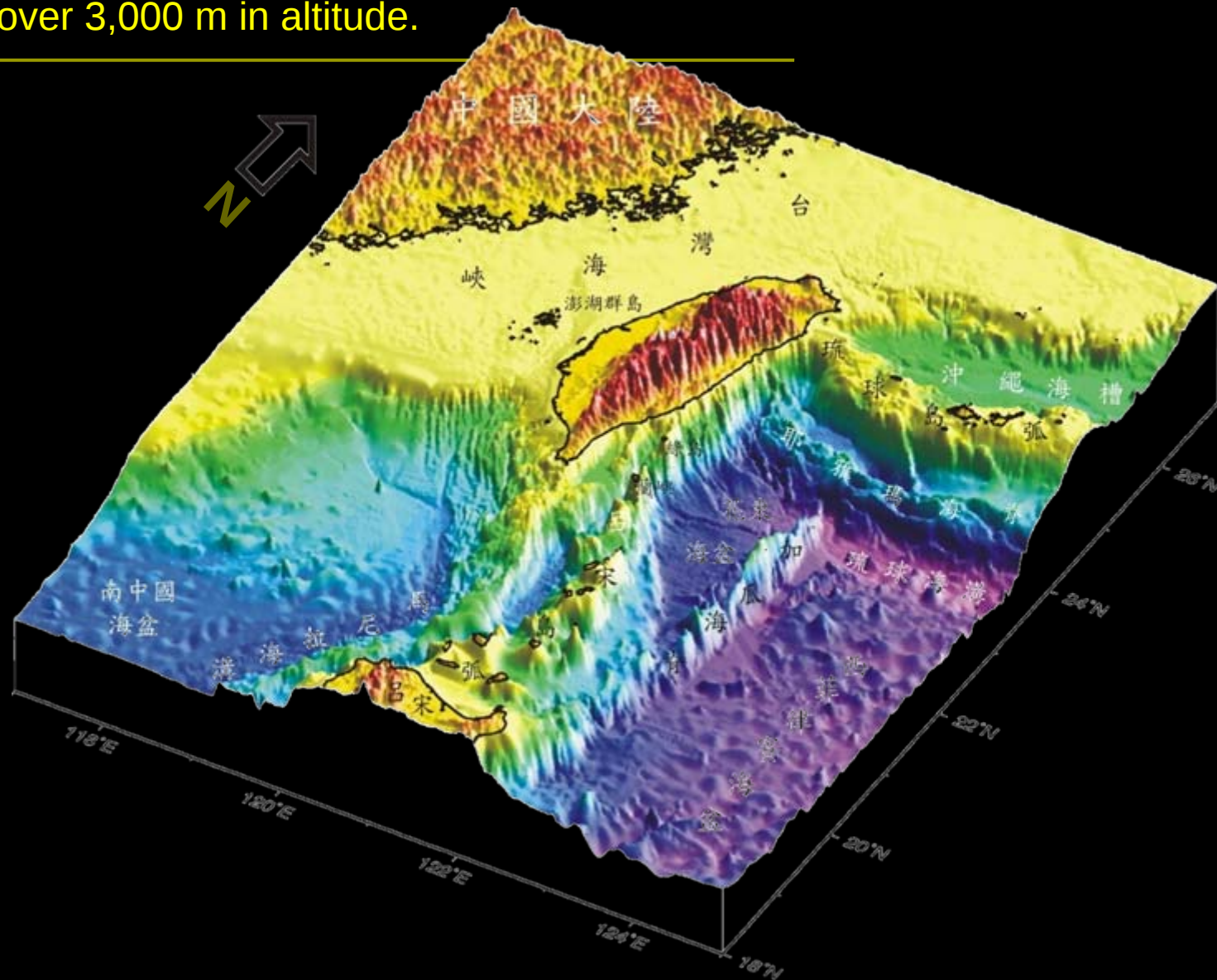
Division of Agricultural Chemistry, Taiwan Agricultural Research Institute
Council of Agriculture, Taichung, Taiwan
and
Department of Agricultural Chemistry, National Taiwan University
Taipei, Taiwan

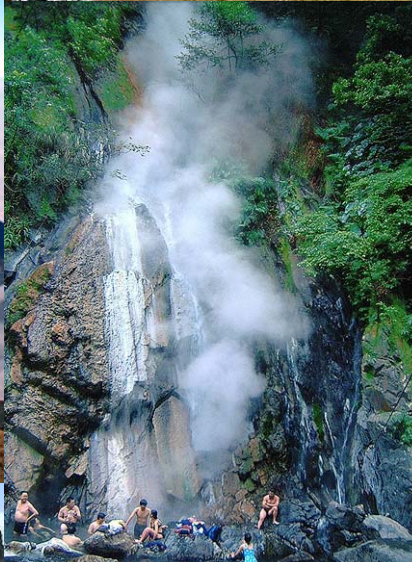


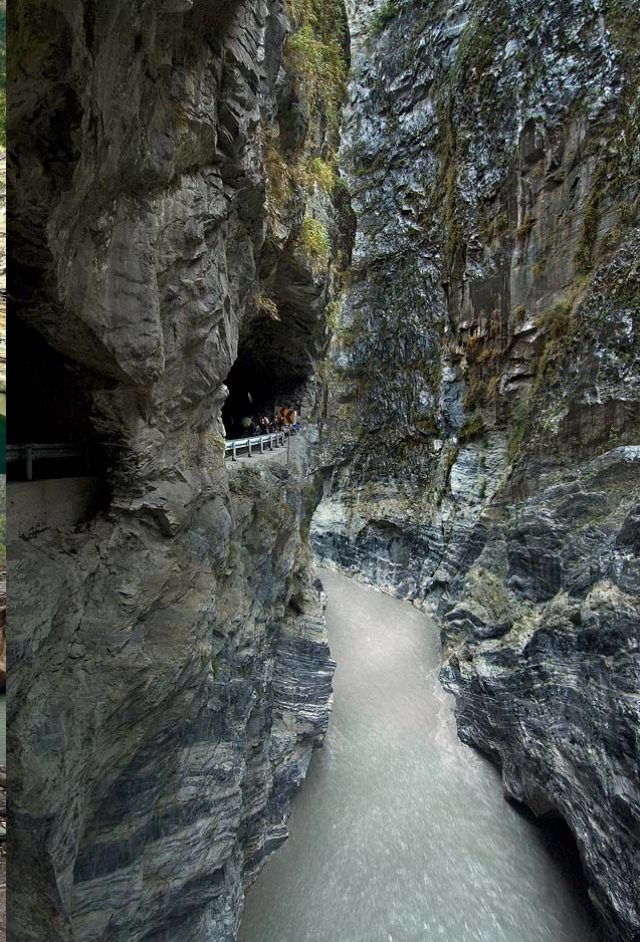
Taiwan

is located at the convergent boundary between the Philippine Sea plate and the continental margin of the Eurasian plate.

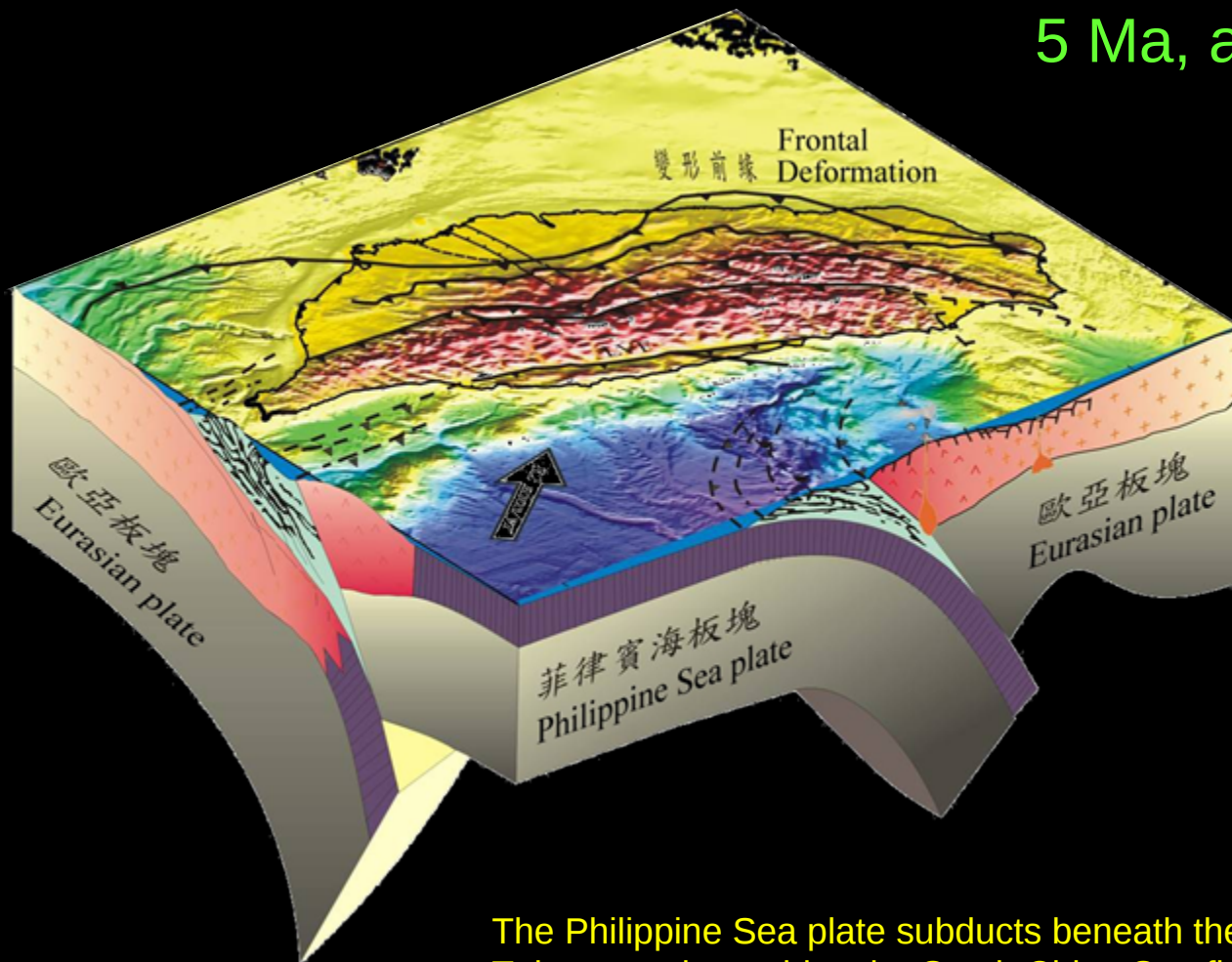
Taiwan is an island located about 150 km off the southeast coast of mainland China. It covers 36,000 km² in area with more than 200 peaks over 3,000 m in altitude.



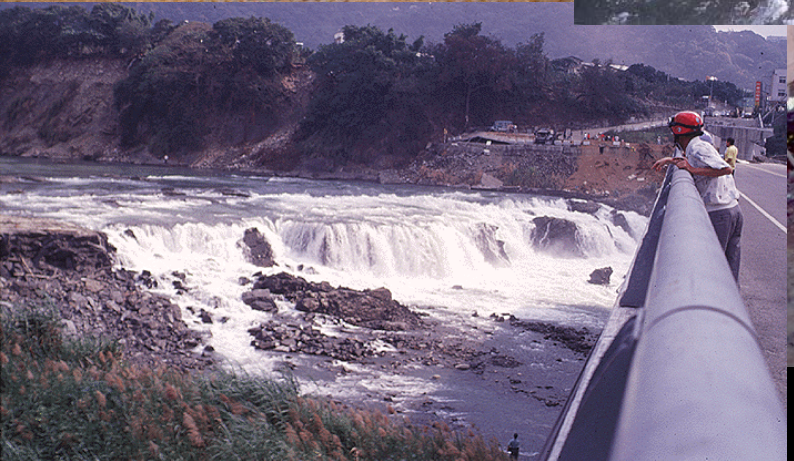
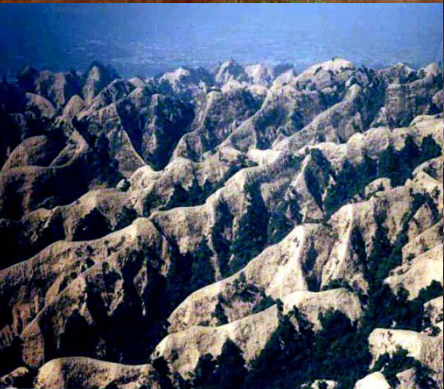
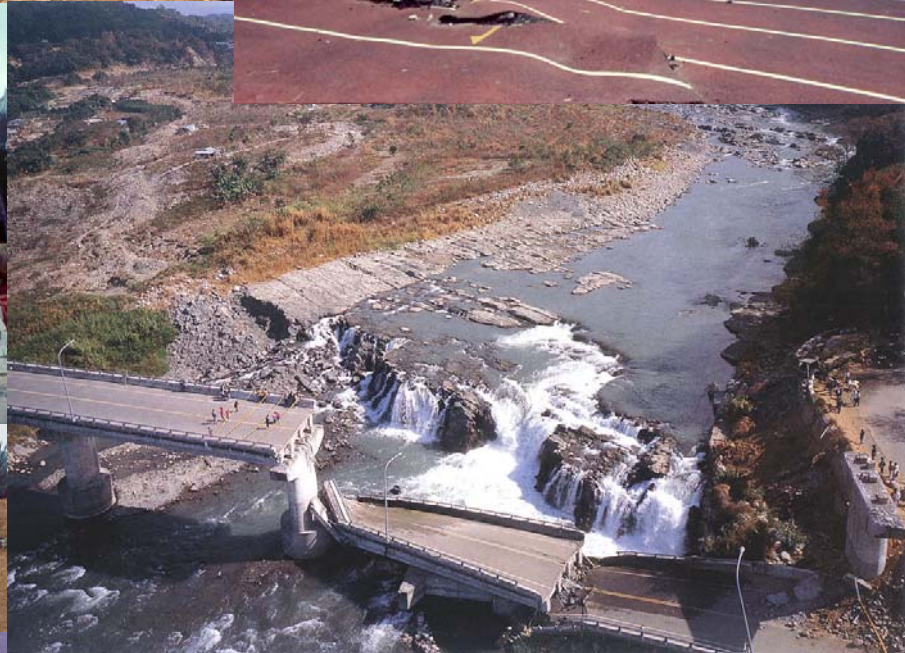




Taiwan has experienced oblique arc-continent collision since about 5 Ma, and is still active.



The Philippine Sea plate subducts beneath the Eurasian plate offshore eastern Taiwan, and overrides the South China Sea floor of the Eurasian plate south of Taiwan





草嶺

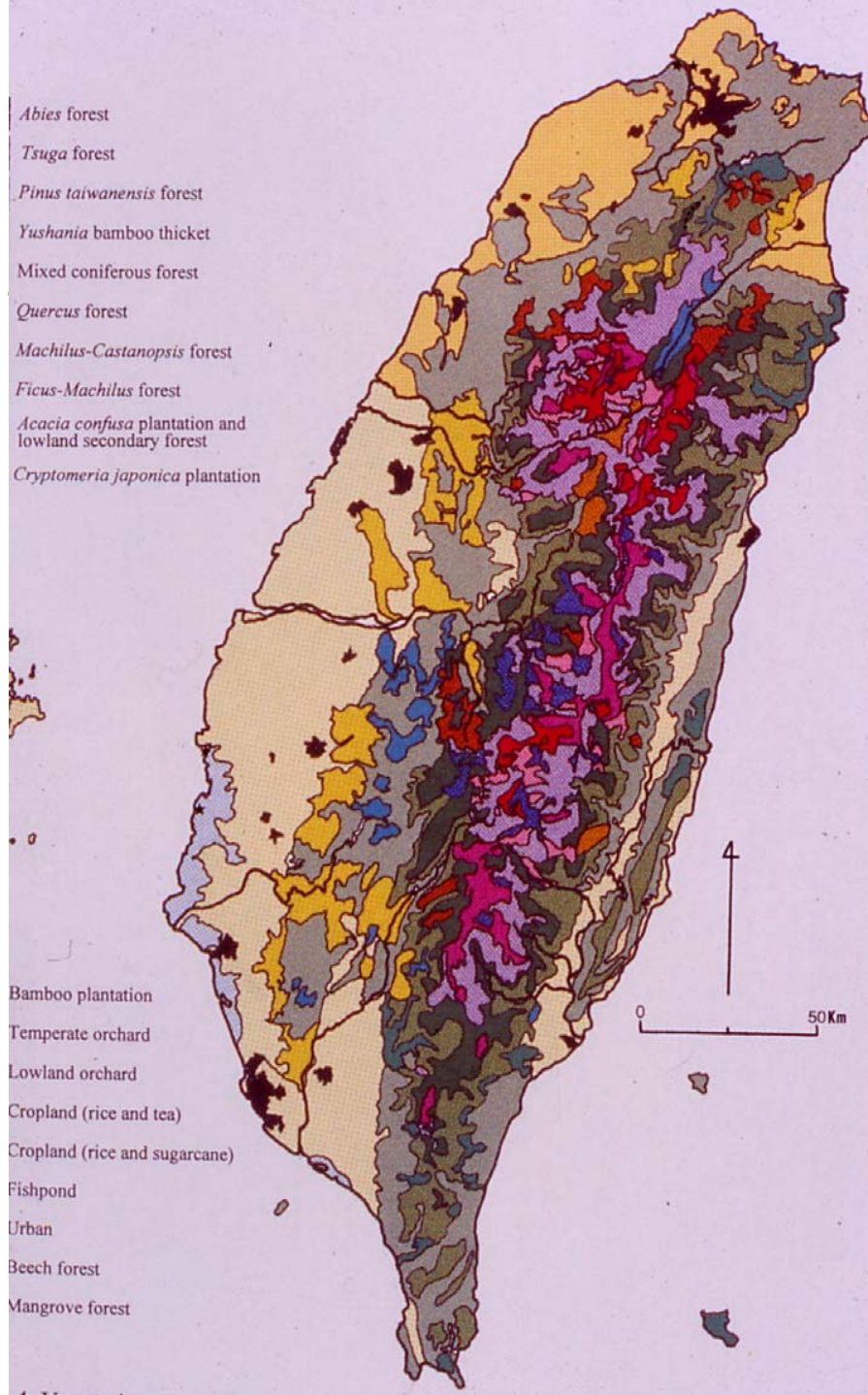
(after the earthquake in Sep 21, 1999)

草嶺

(before the earthquake in Sep 21, 1999)

Map of Vegetation Types of Taiwan

(cited from *Taiwan flora*)



Rural soils of Taiwan

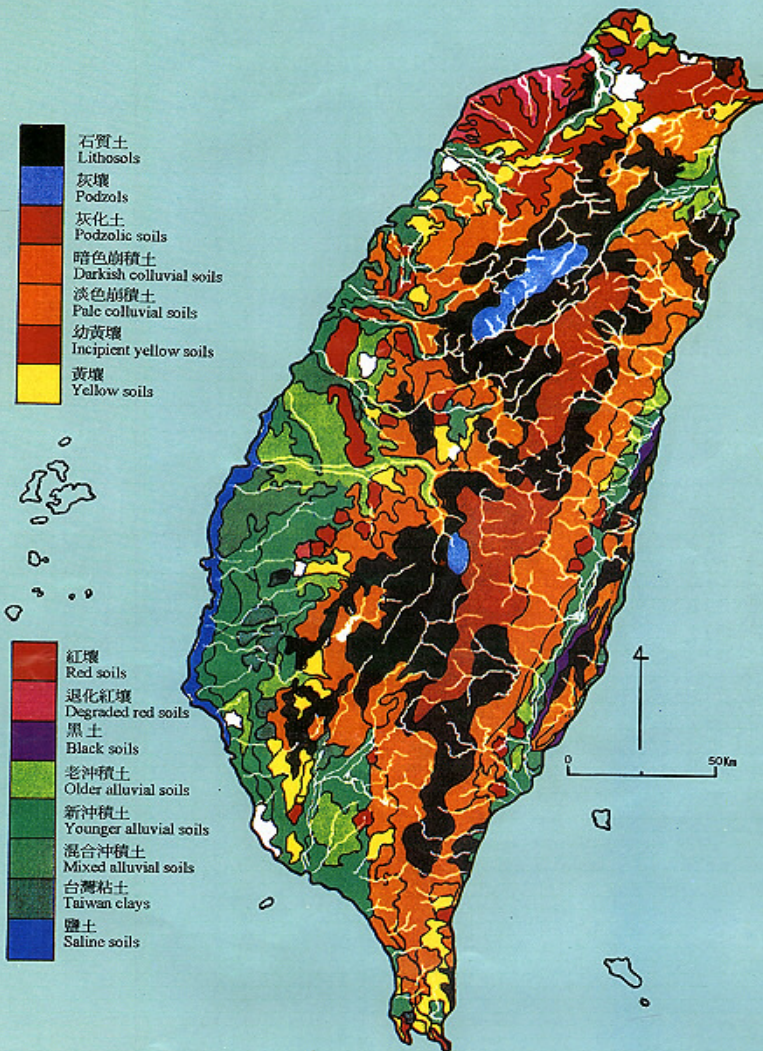
- ❑ **620 soil series** in Taiwan rural soils can be classified as 9 Soil Orders.
- ❑ The major Soil Orders are **Inceptisols (51.0 %)**, **Alfisols (21.8 %)**, **Ultisols (9.6 %)** and **Entisols (6.8 %)** of total rural soils.
- ❑ Other major Soil Orders are **Oxisols (0.3 %)**, **Histosols (0.04 %)** and **Vertisols (0.01 %)** of total rural soils.
- ❑ Soil mapping scale is 1:25,000

Forest soils in Taiwan

- 9 Soil Orders were classified for the **432** soil series in Taiwan forest soils.
- The major Soil Order are **Inceptisols (44.2 %)**, **Entisols (35.3 %)**, **Alfisols (10.8 %)** and **Ultisols (7.5 %)** of total forest soils in Taiwan (Hseu et al., 2008).
- Each of **Andisols and Mollisols** occupied as only 1 % of total rural soils (Tsai and Chen, 2011).
- Other Soil Orders are **Spodosols (0.06 %)**, **Histosols (0.01 %)** and **Vertisols (0.01 %)** of total forest soils (Tsai and Chen, 2004).
- Soil mapping scale is 1:25,000

Distribution of Major Soil Groups In Taiwan

Soil Map



(重繪自謝兆申和王明果, 1991)
(Redrawn from Sheh and Wang, 1991)

4-B

Geology Map

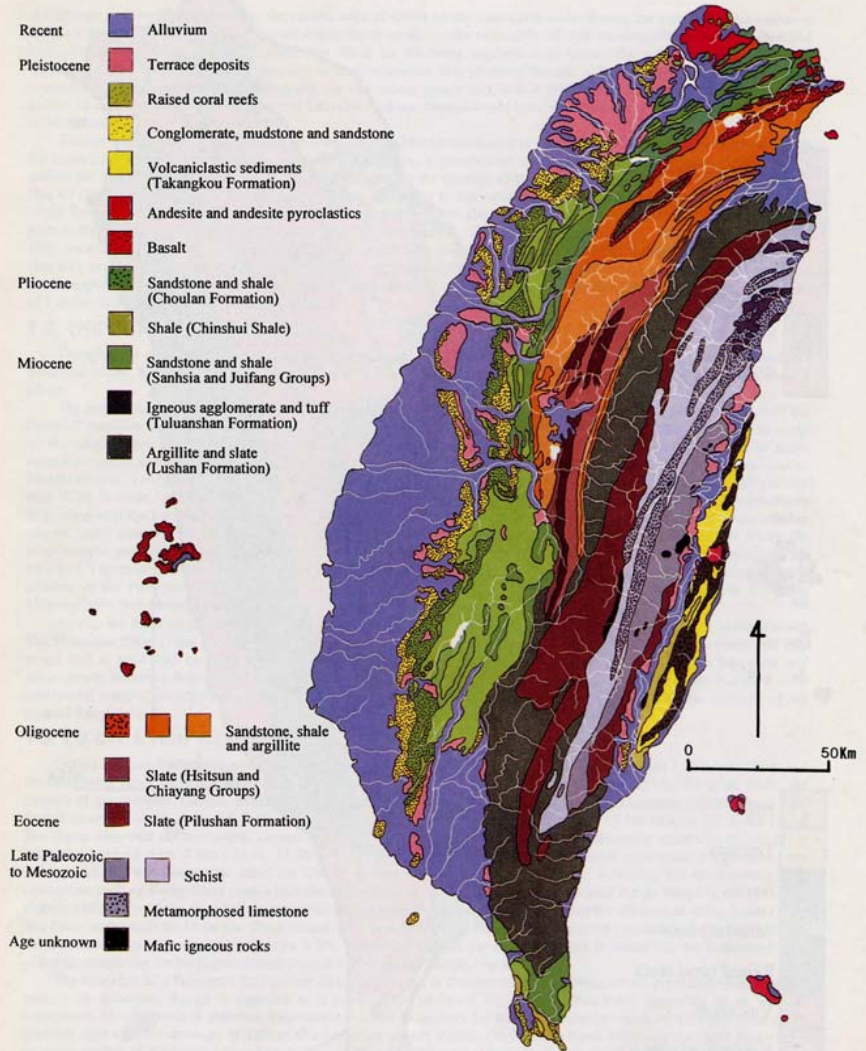


Fig. 2. Geologic map of Taiwan. (Redrawn from Ho, 1986.)

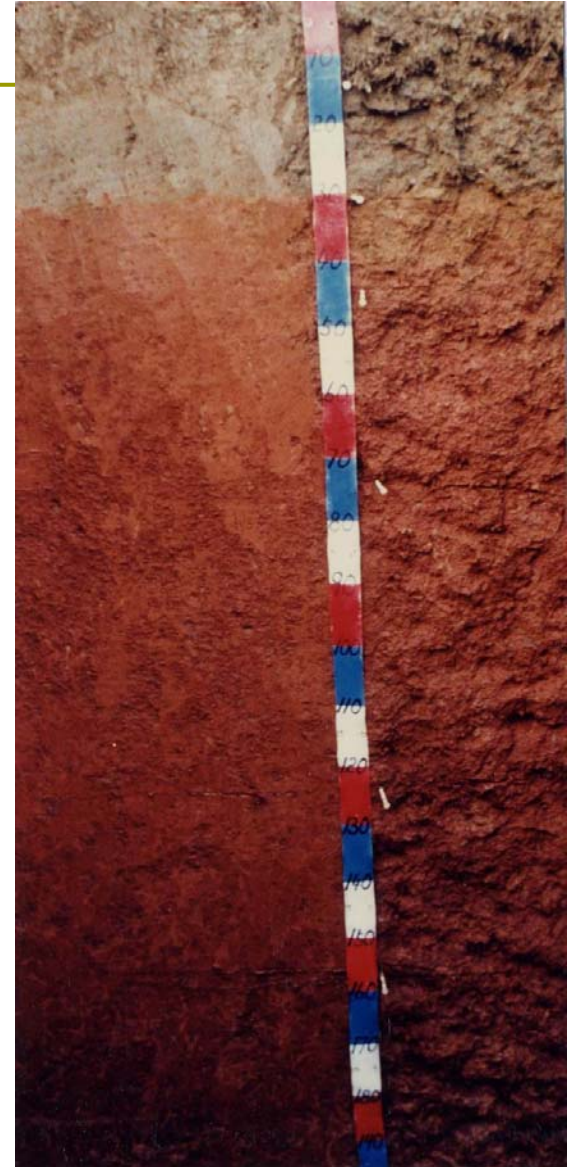
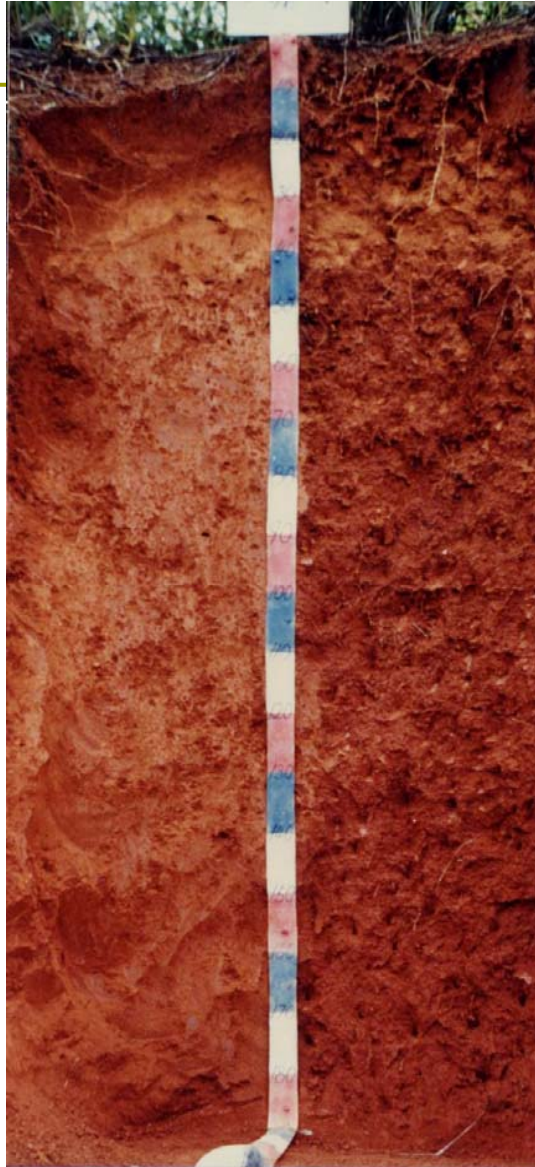


Entisols
distributed
in recent
alluvial soils

Inceptisols distributed in older alluvial soils



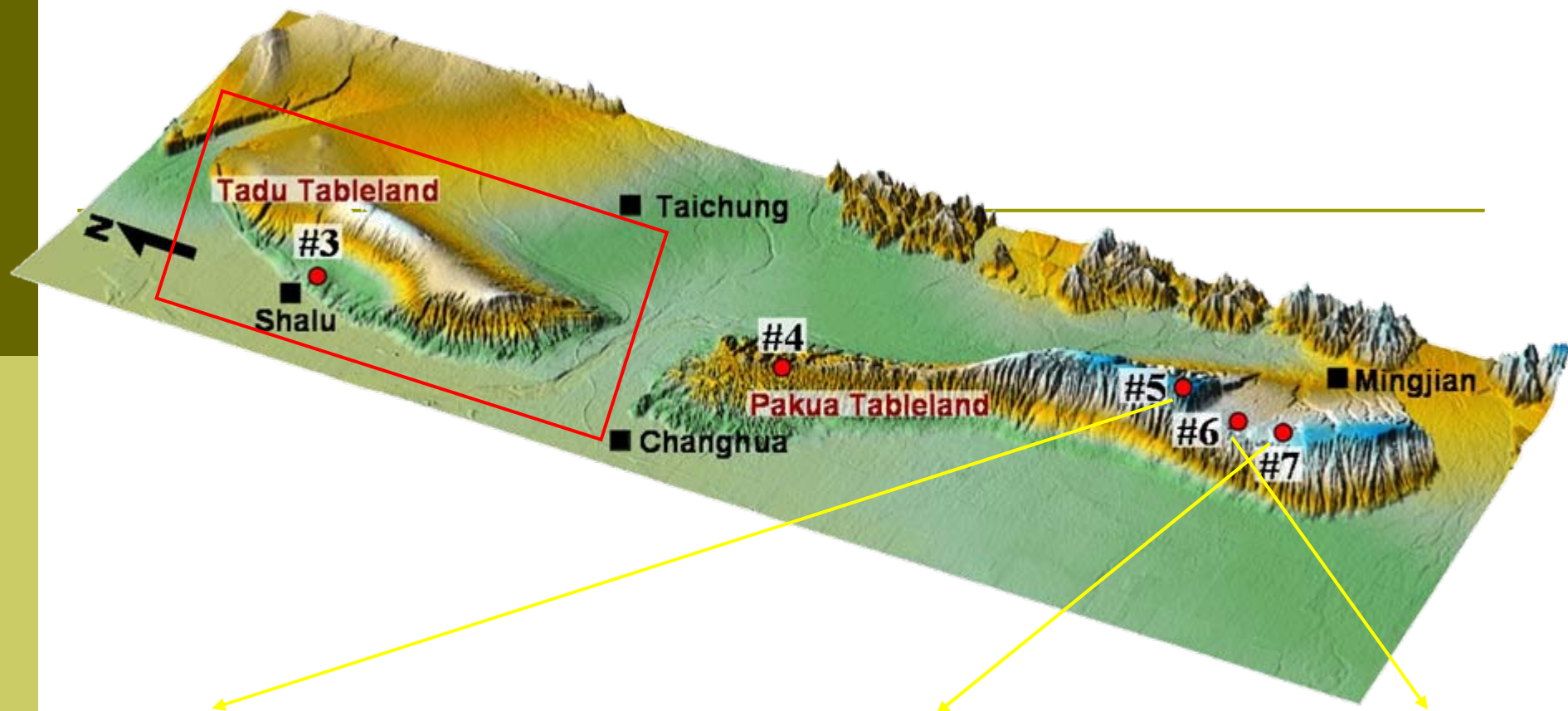
Ultisols distributed in the terrace





Terrace deposit





PK-1



PK-2



PK-3



PK-4

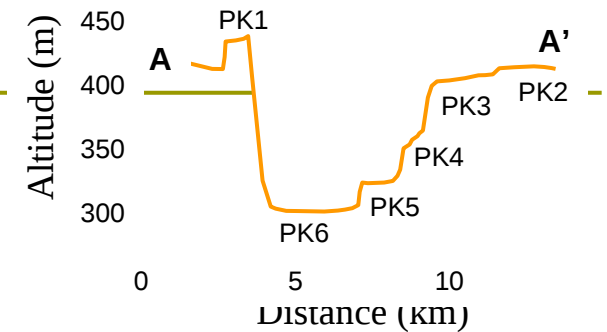
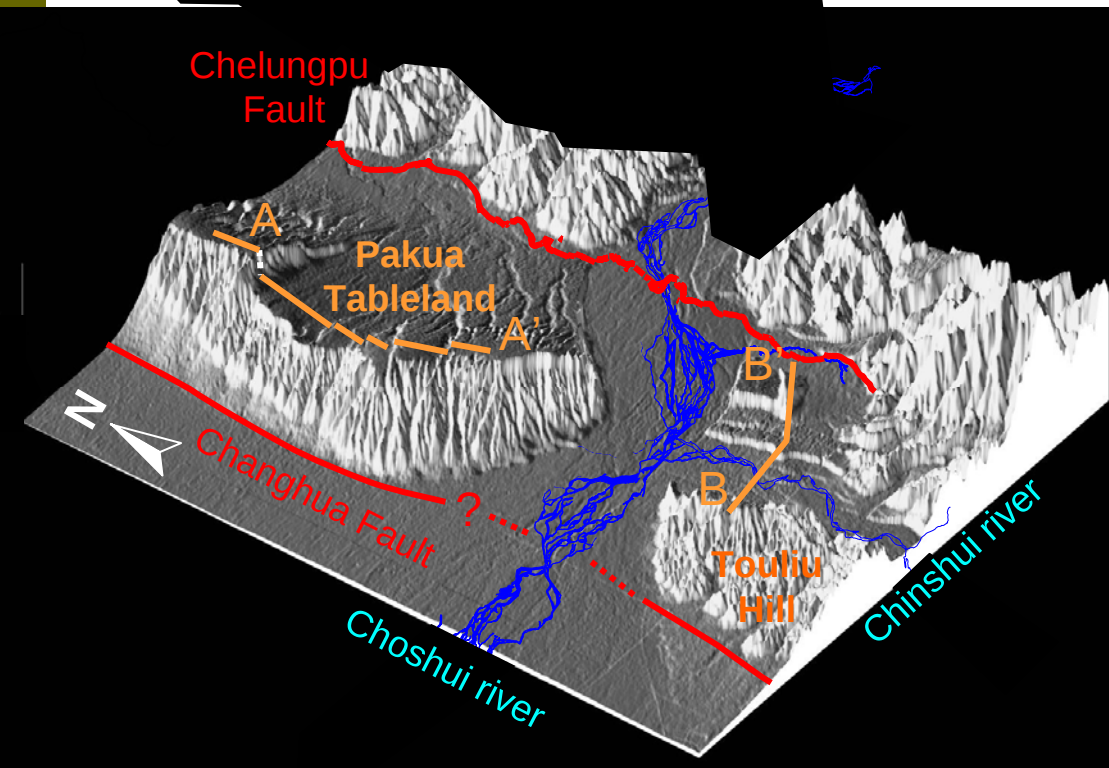


PK-5

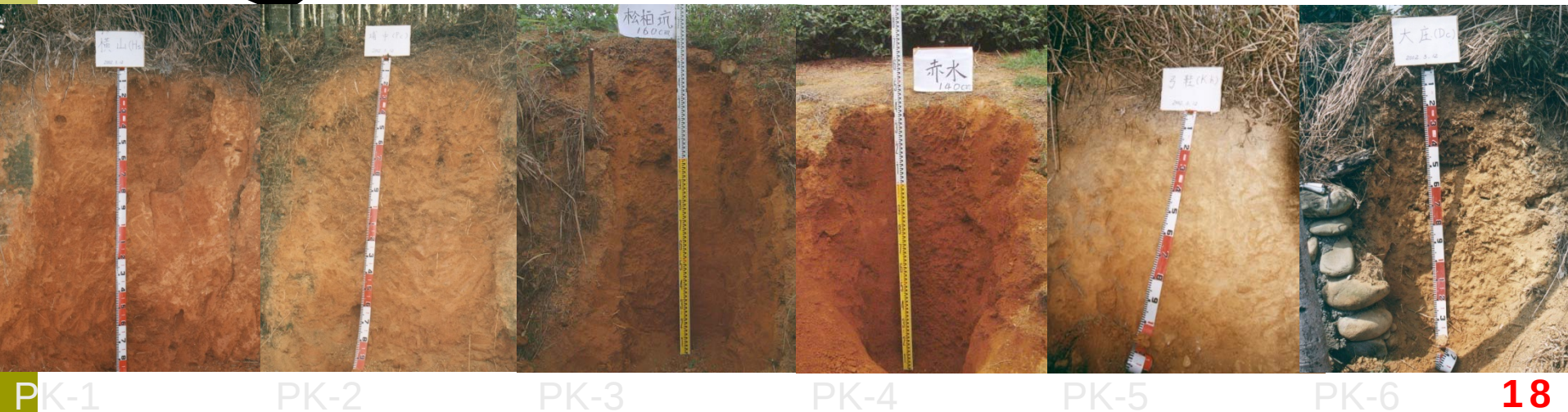


PK-6

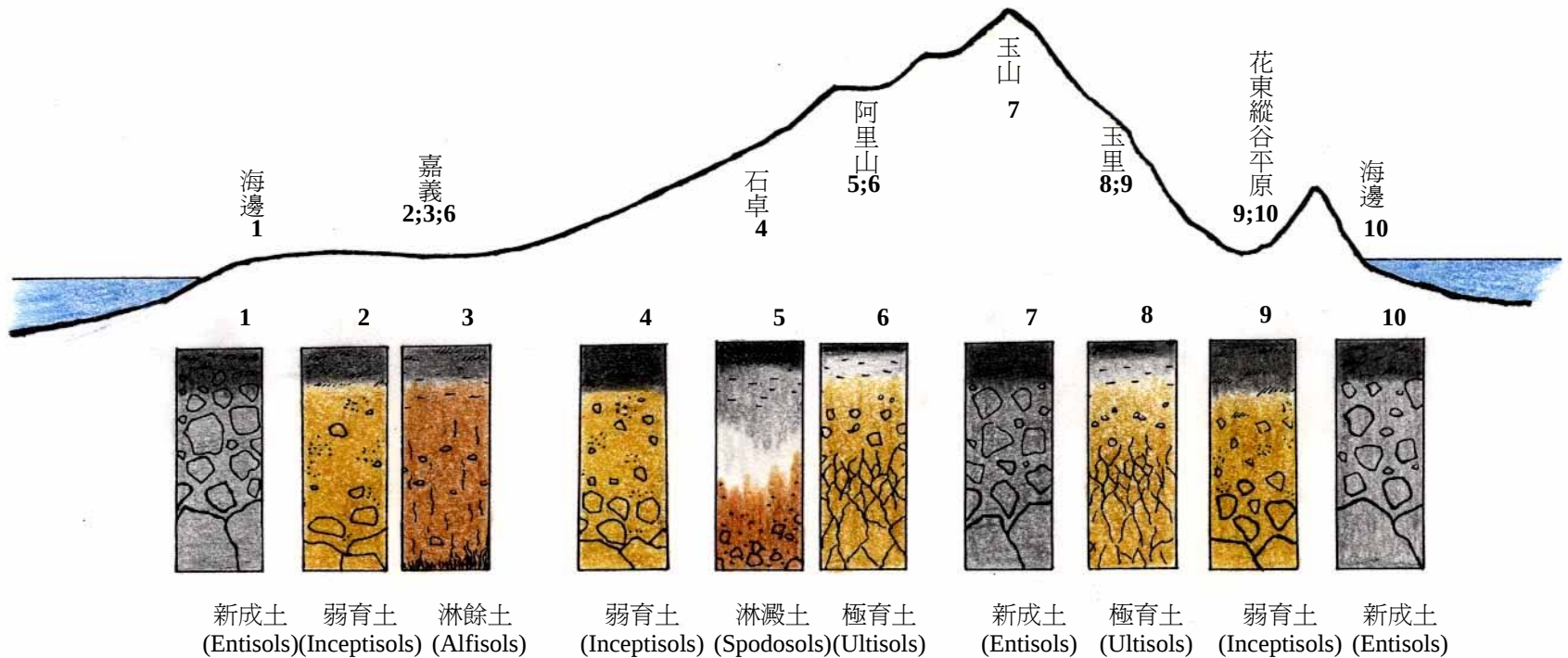
Field Morphology :



The color of the soils graded from strong brown to yellowish red, which in trend roughly agree with the ascending altitude of terraces.



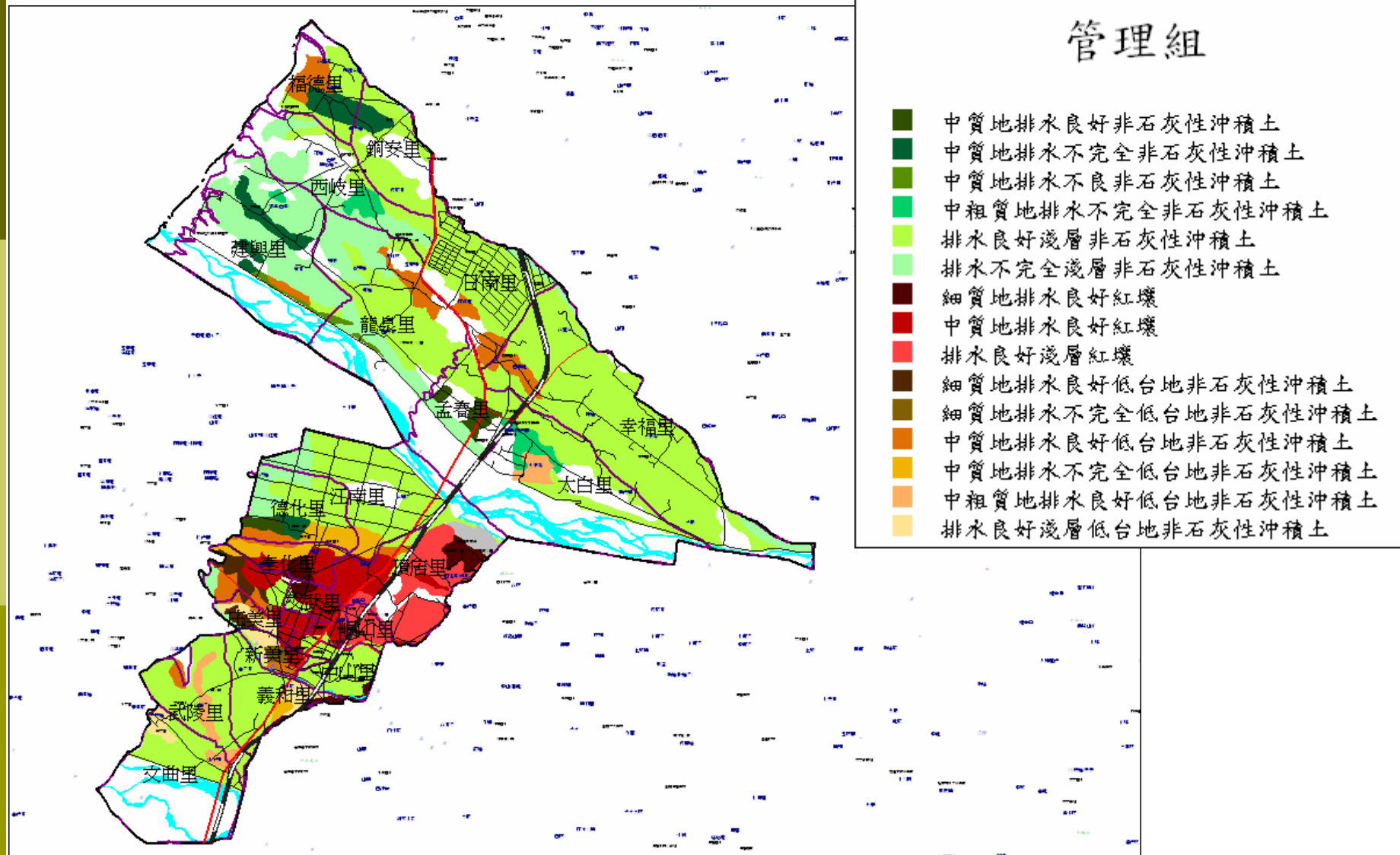
Distribution of major soil groups in Taiwan



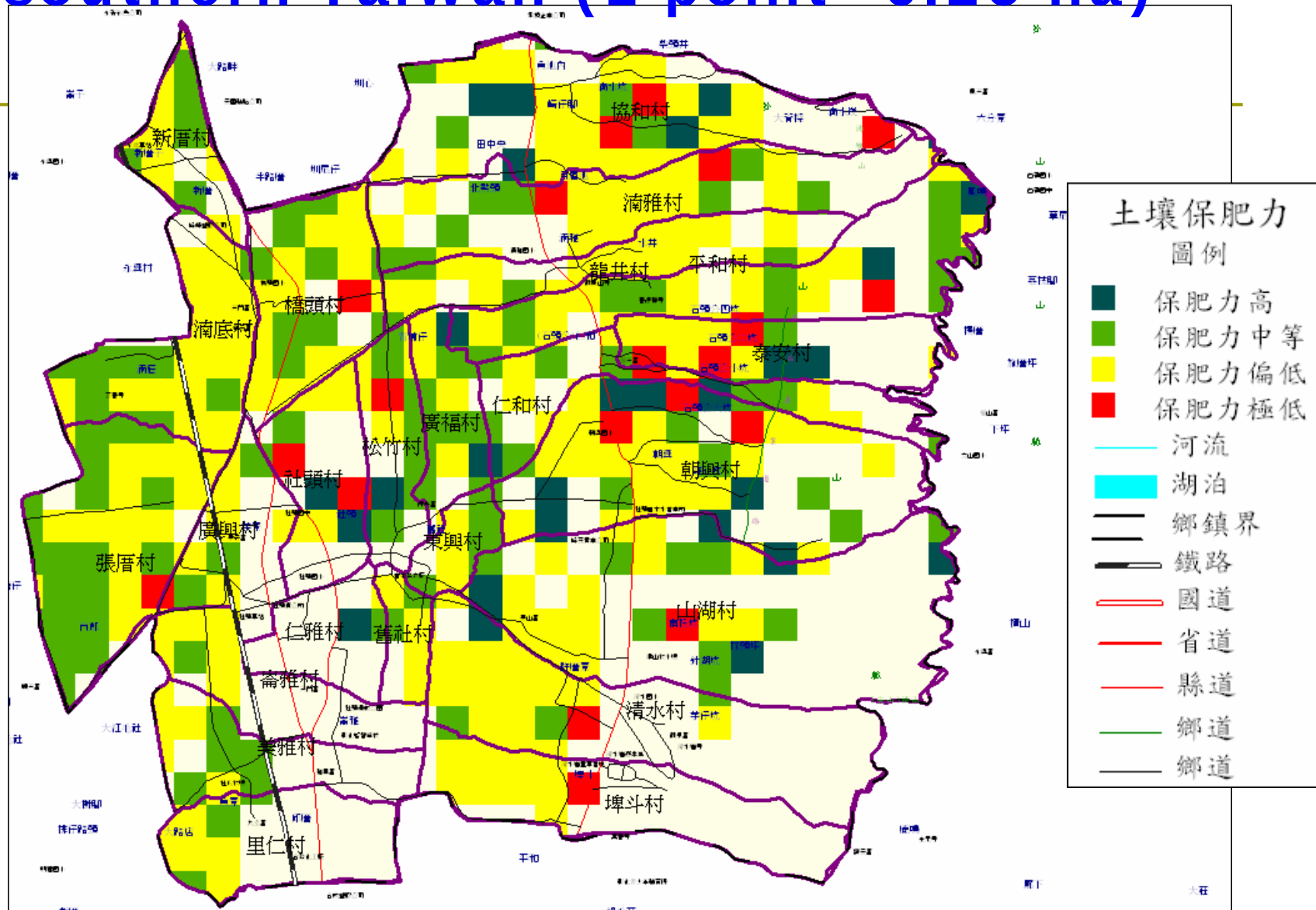
Application of Soil Information System (SIS) in Taiwan

- ❑ Crop production and environmental conservation
- ❑ Reasonable fertilizer application and recommendation system
- ❑ Different development projects
- ❑ Land assessment of low productivity
- ❑ Soil liquefaction assessment
- ❑ Food safety assessment
- ❑ Land cover crop assessment
- ❑ Soil carbon stock assessment

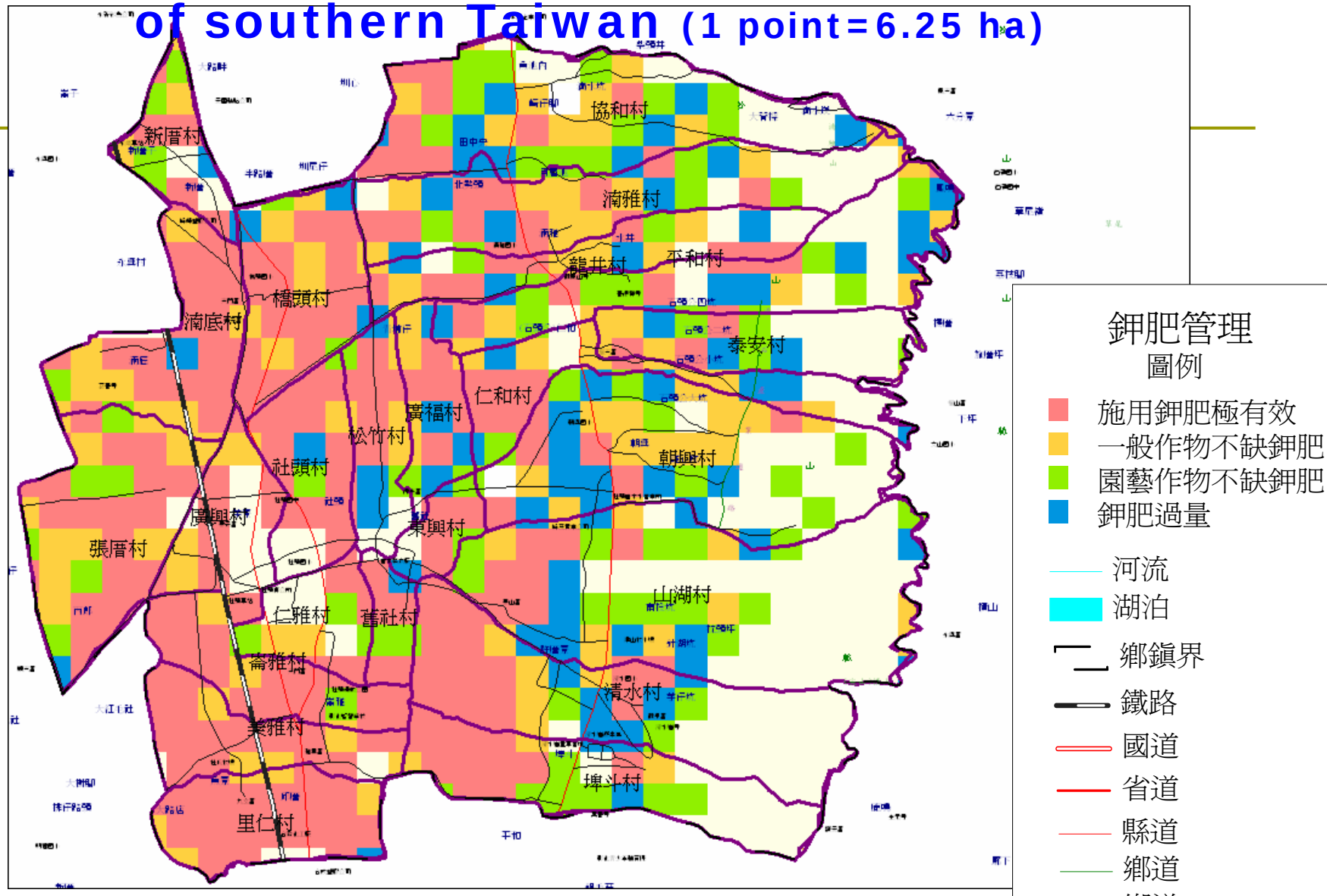
Soil management Group of county of central Taiwan



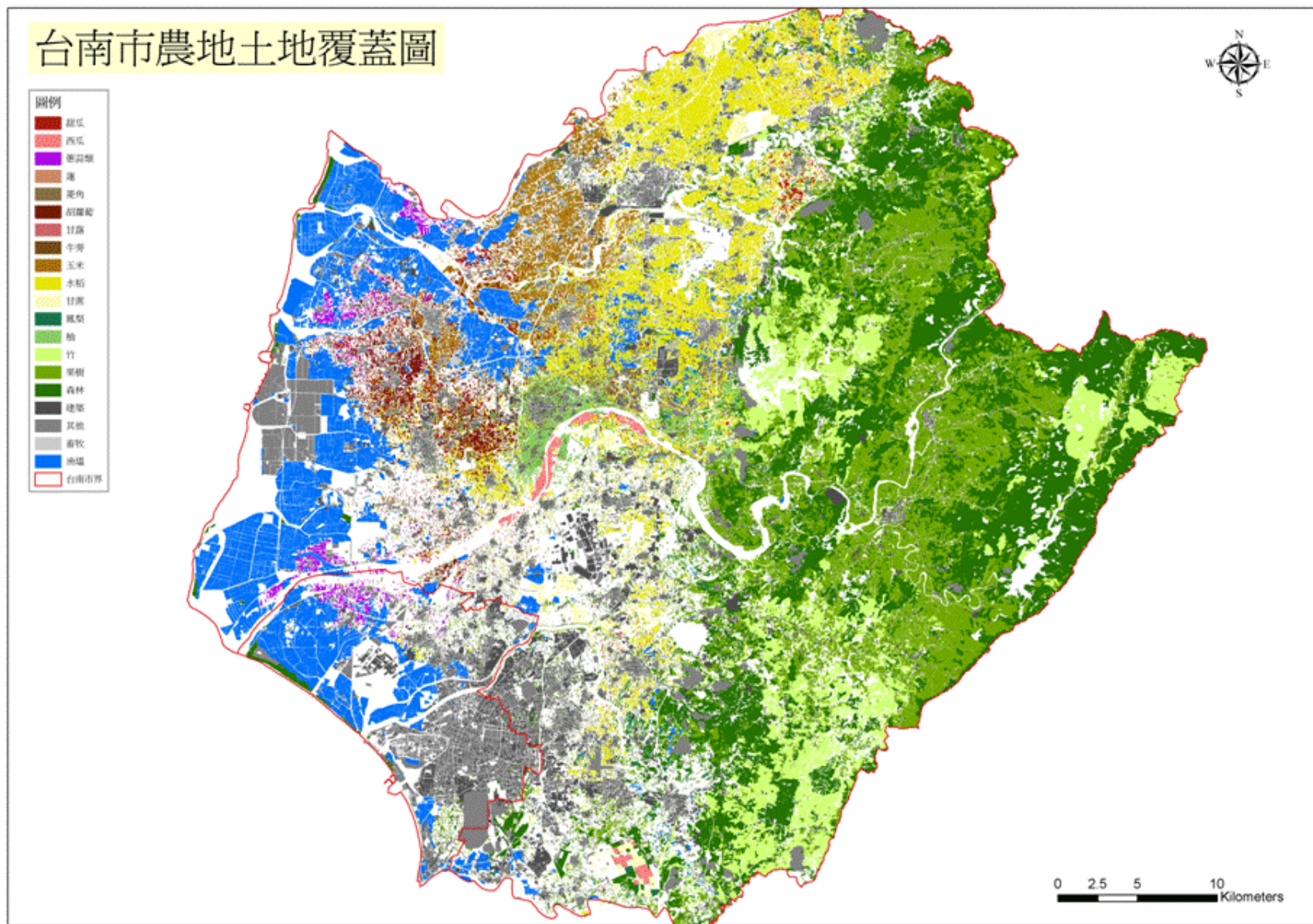
Soil fertility grating in villages of southern Taiwan (1 point=6.25 ha)



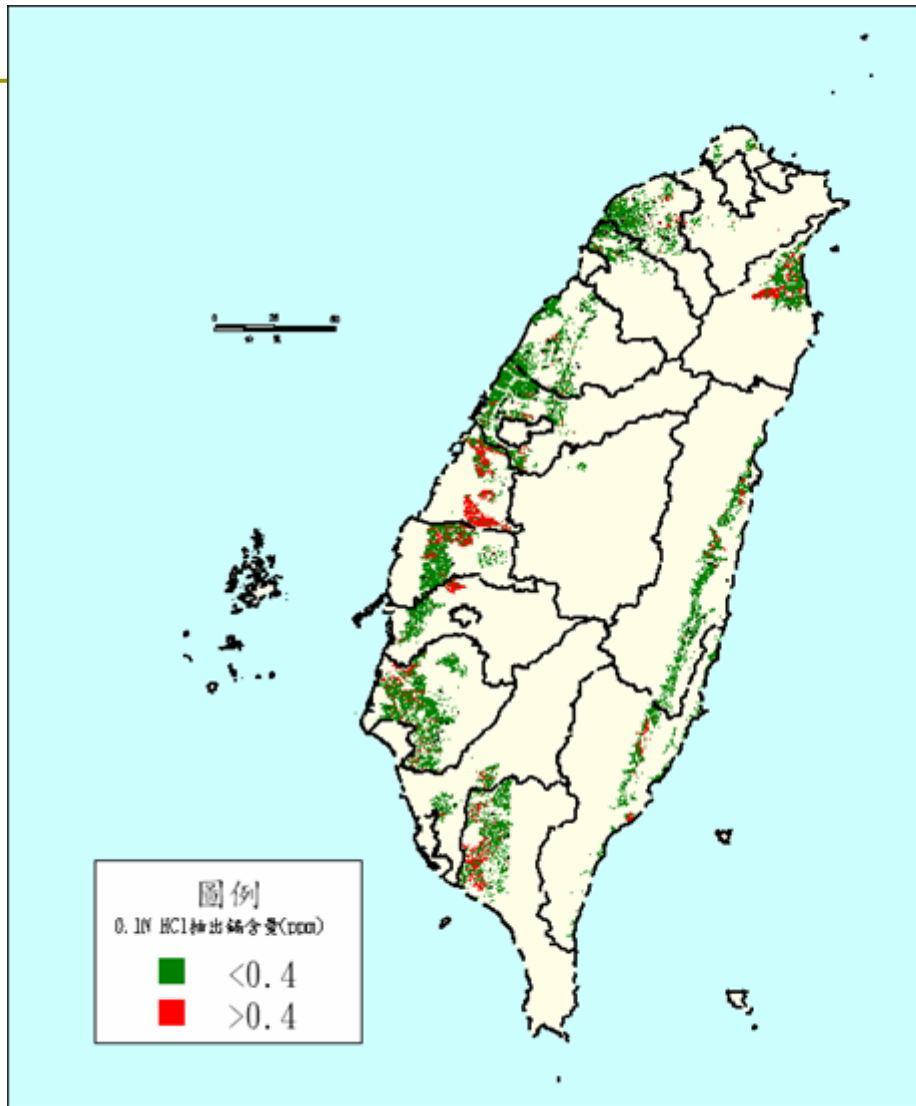
Soil nutrient (K) content in villages of southern Taiwan (1 point=6.25 ha)



Land cover crops of Tainan city of southern Taiwan

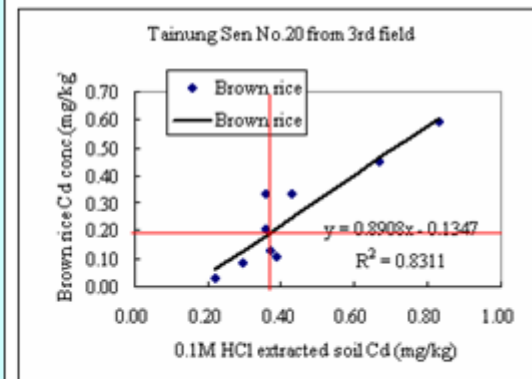


Prediction the area for producing Cd Rice in whole Taiwan



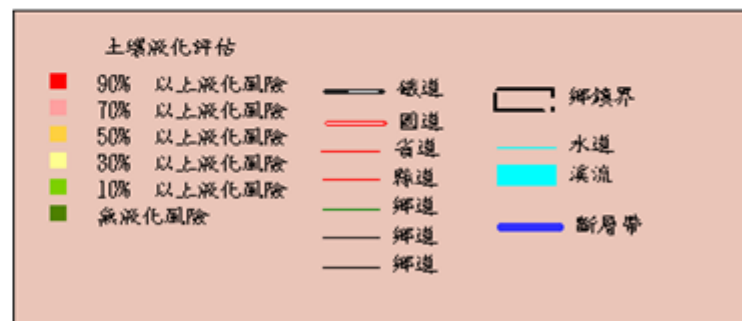
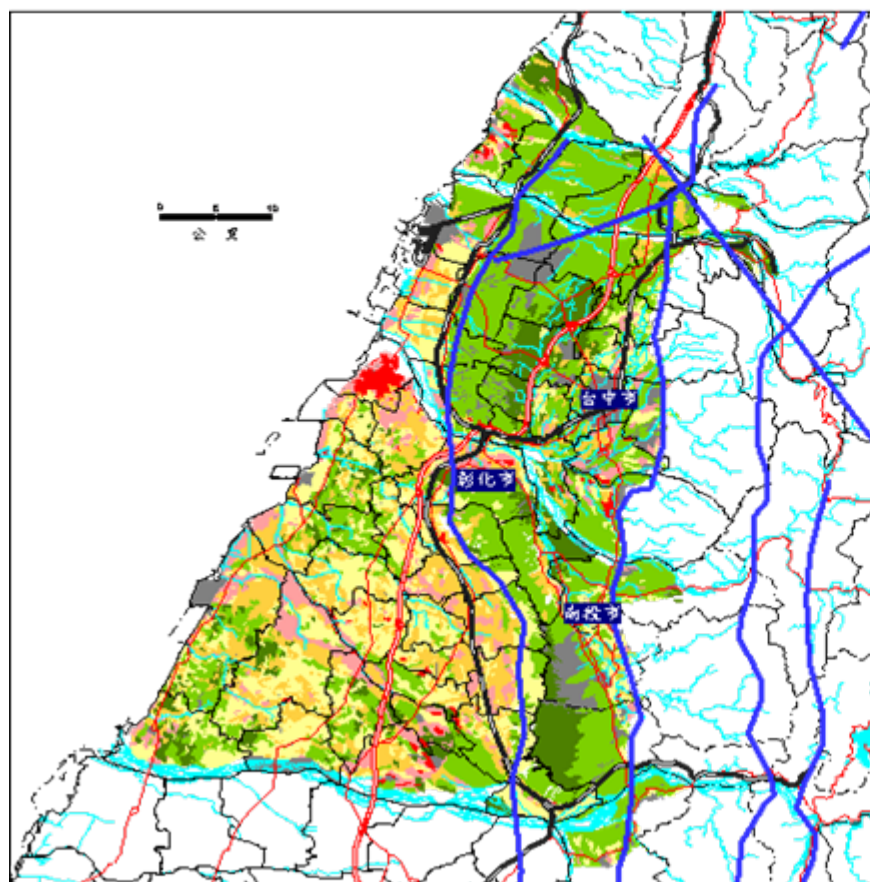
鎘米反制之政策分析

資料應用範例：
預測不適合栽種
台農私20號的地
區(紅色)



Soil liquefaction assessment in central Taiwan

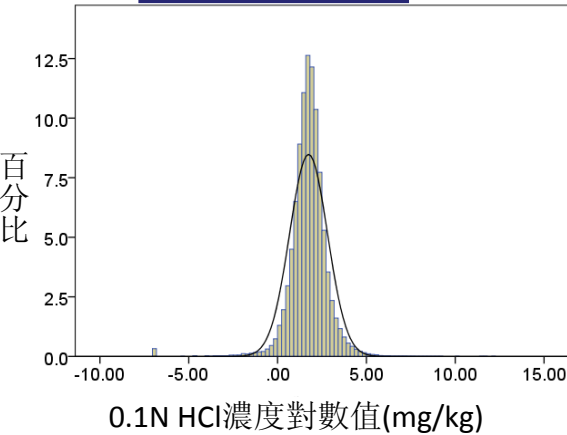
土壤液化分析圖---中彰投地區



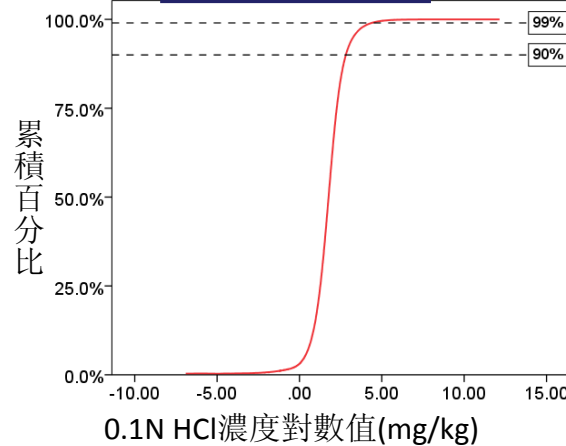


Distribution of Zinc total contents in Taiwan (total sample no. 101,209)

常態分配直方圖



累積濃度百分比

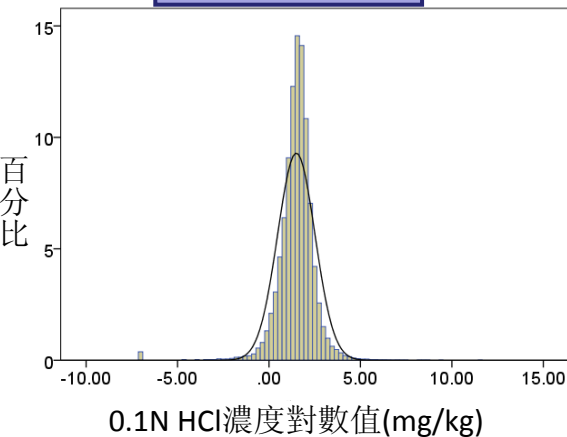


表層土壤調查資料

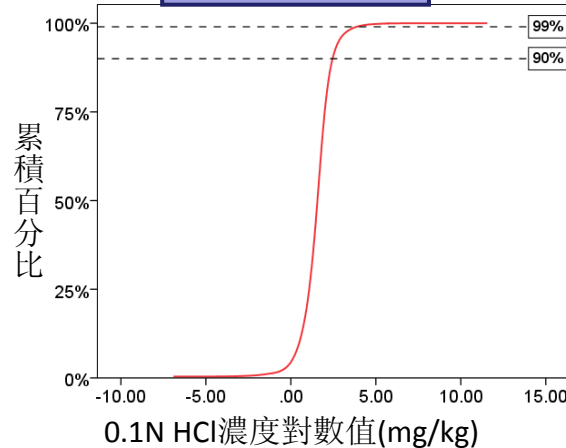
	0.1N HCl萃取	換算成王水全量
最大值	188,590.86	942,954.30
平均值	15.83	79.15
中位數	5.85	29.25
標準差	825.18	4,125.90
99%	80.33	401.65

資料筆數: 130,722筆

常態分配直方圖



累積濃度百分比



裡層土壤調查資料

	0.1N HCl萃取	換算成王水全量
最大值	104,459.75	522,298.75
平均值	8.57	42.85
中位數	4.77	23.85
標準差	332.75	1,663.75
99%	47.93	239.65

資料筆數: 101,209筆

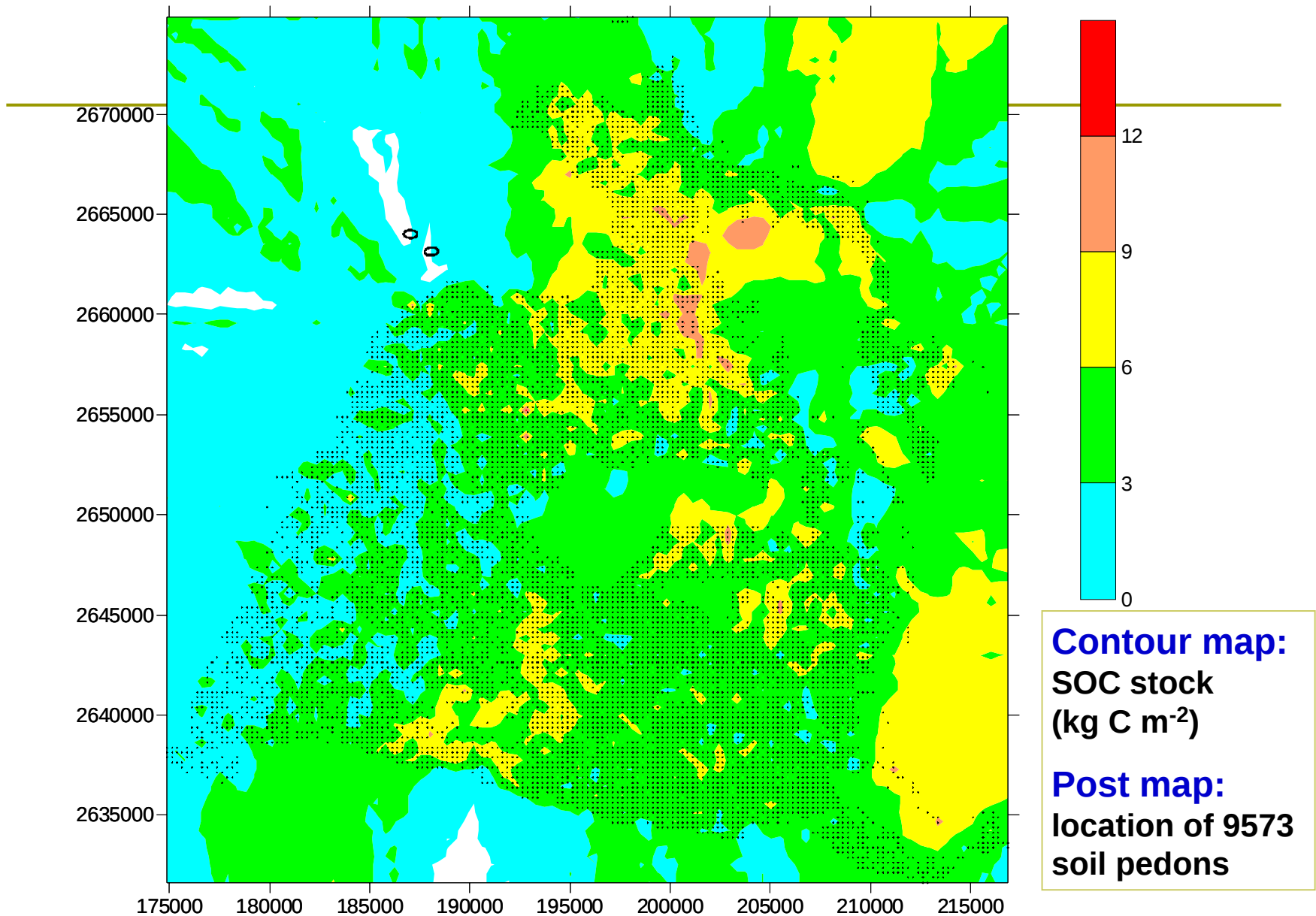
Soil Organic carbon Stocks

- ❑ by Using Estimated Bulk Density in the Rural Soils of Taiwan
- ❑ To mapping the soil carbon stocks of the rural soils (0-150 cm) from legacy data in Taiwan
- ❑ A pedotransfer function (PTF) was developed based on mean depth (d) of the sample and soil organic carbon (SOC) from 184 samples:

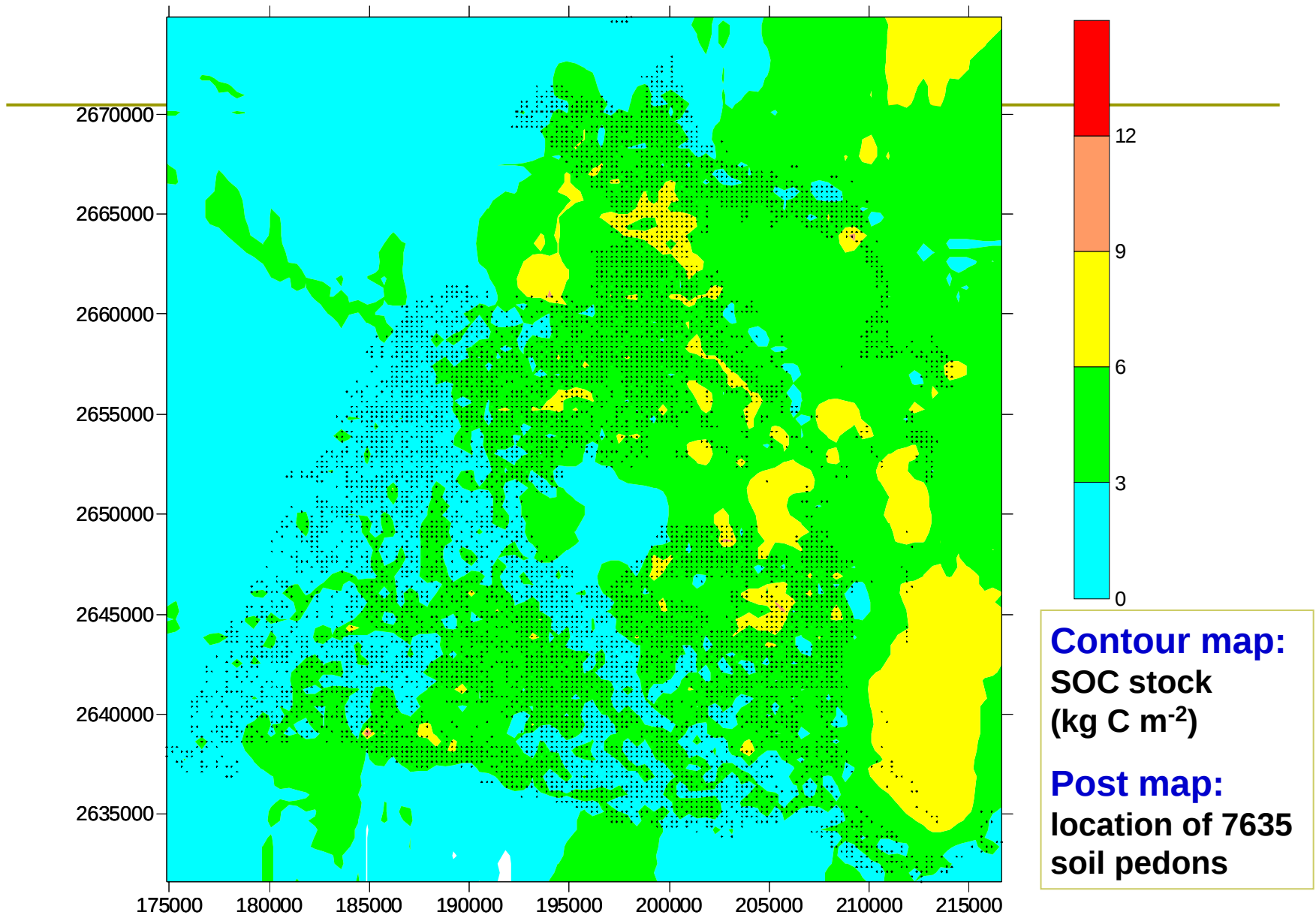
$$Bd = 1.3026 + 0.169 \log(d) - 0.0256 [\ln(SOC)]^2$$

- ❑ To predict and mapping the SOC stocks from **33,173** soil pedons

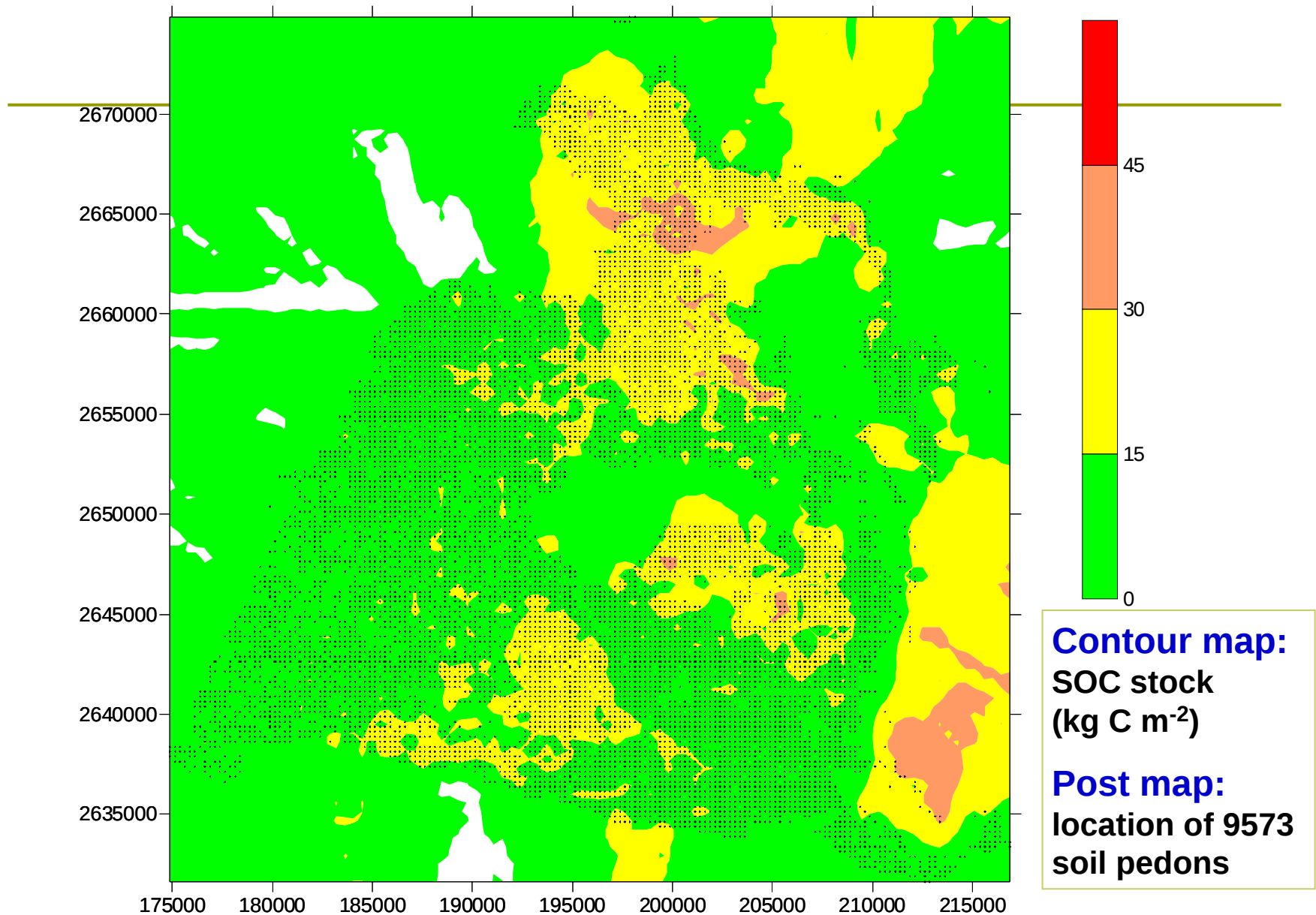
SOC stock (0-30 cm) of Changhua county



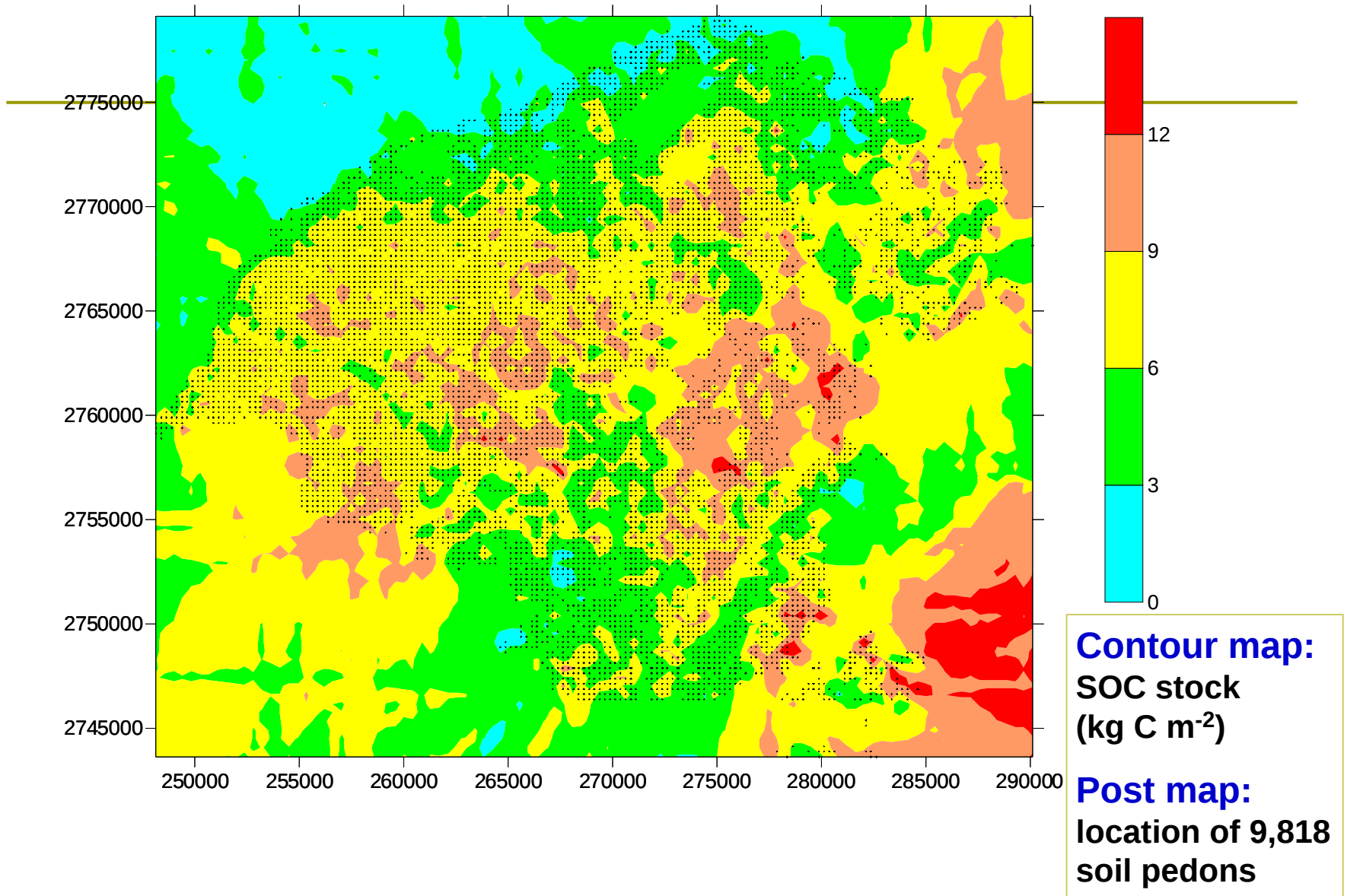
SOC stock (30-60 cm) of the Changhua county



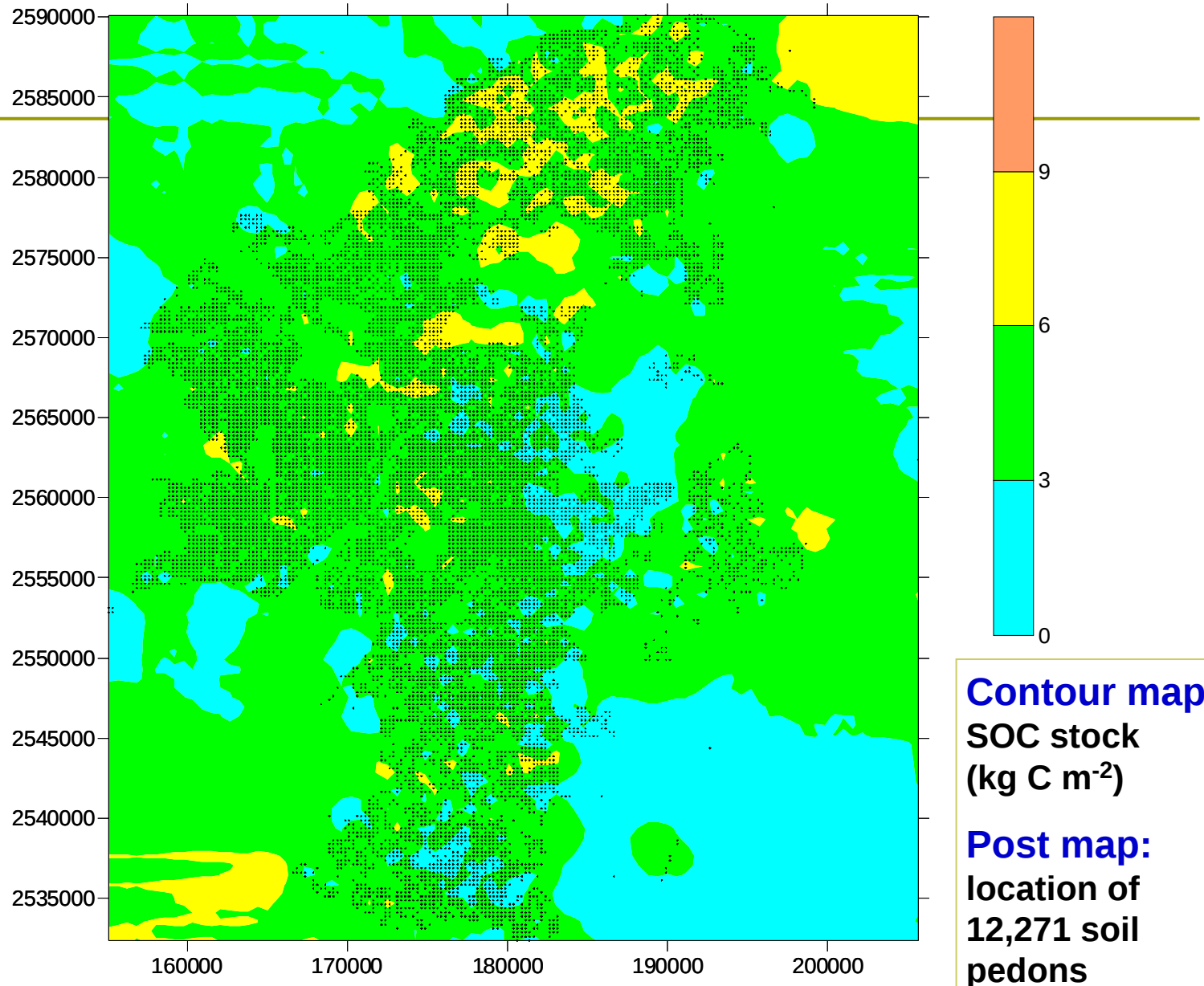
SOC stock (0-150 cm) of the Changhua county



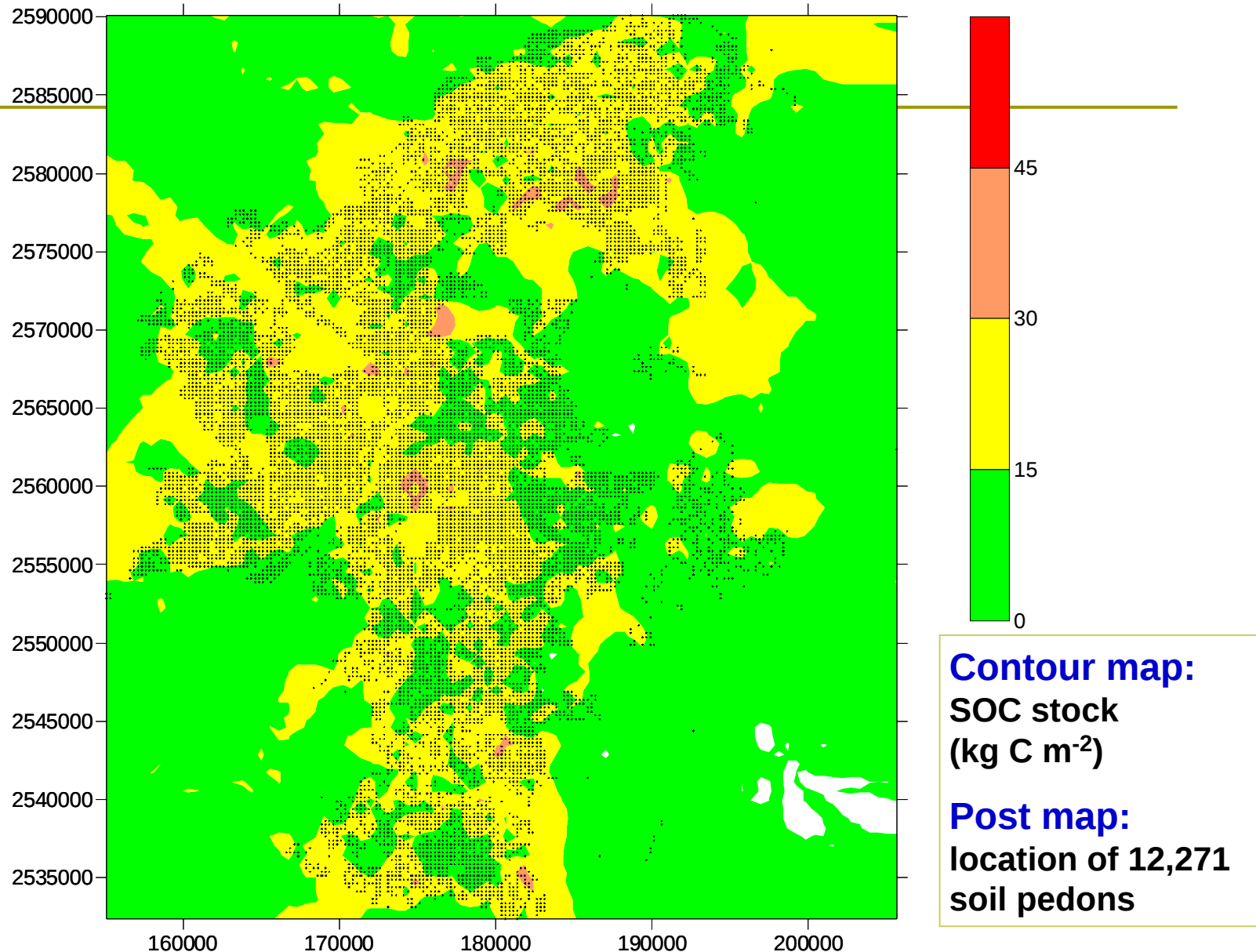
SOC stock (0-30 cm) of the Taoyuan county



SOC stock (0-30 cm) of the Tainan county



SOC stock (0-150 cm) of the Tainan county



Thank you for your attention

and
welcome to

Taiwan

