A crisis of irrigation farming by saline deposit in northern edge of Tarim basin

A.Ito : Space Engineering Development Co.,Ltd (SED),Chiba University
T.Ishiyama,K.Koutake, F. Nishio : Chiba University
S. Jalalidin :Xinjiang University , China

1.Background

The desertification area of irrigation farmland has extended in the oasis in northern edge of Tarim basin

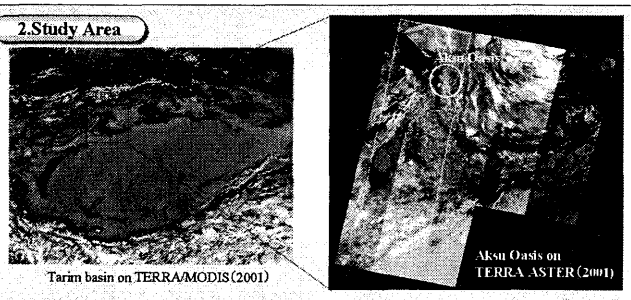
What is the cause?

By saline deposit ?

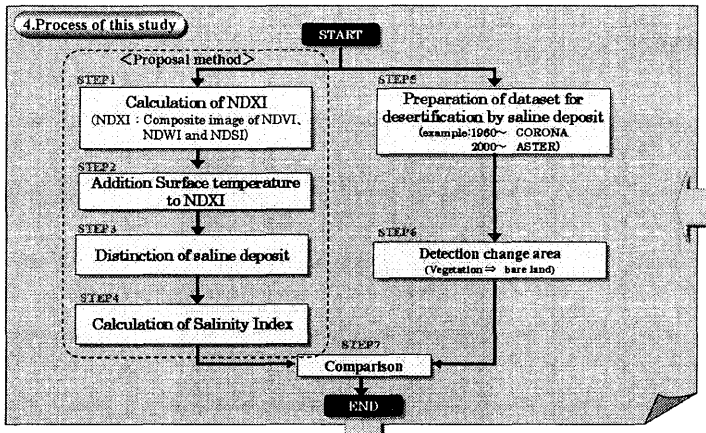
Objective

- Development the method for detection the saline deposit area.
- Understand the distribution of desertification by saline deposit.

2.Study Area



4.Process of this study

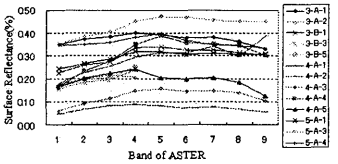


3.Field Survey

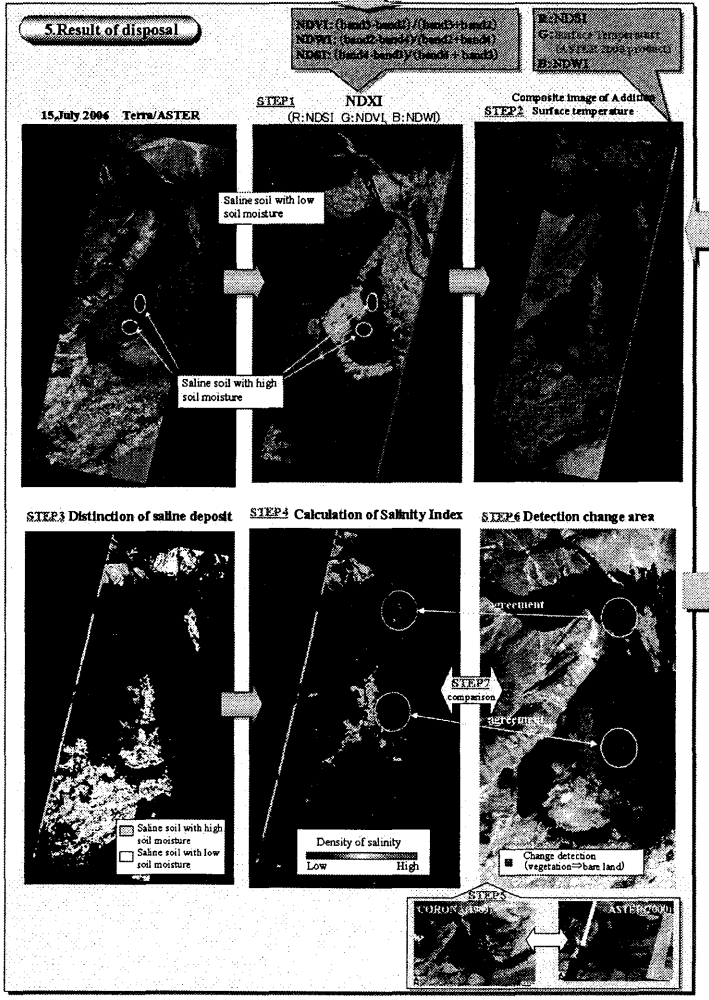
Number	Soil moisture (m3/m3)	Density of Salinity (ppt)
3-A-1	0.409	12.88
3-A-2	0.453	9.30
3-B-1	0.039	37.75
3-B-3	0.030	40.60
3-B-5	0.040	44.60
4-A-1	0.477	20.10
4-A-2	0.448	4.97
4-A-3	0.441	12.84
4-A-4	0.076	9.42
4-A-5	0.492	12.09
5-A-1	0.036	10.56
5-A-3	0.454	16.34
5-A-4	0.367	20.77
5-A-5	0.404	29.16

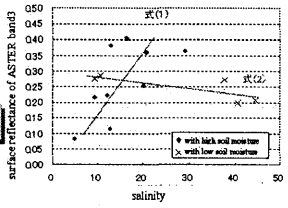
Photograph the saline deposit in irrigation farmland

Measurement Result of Saline deposit area



5.Result of disposal

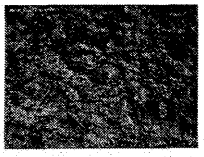




Saline soil with high soil moisture
$y=0.0107x + 0.1033 (R^2=0.417)$ 式(1)
Saline soil with low soil moisture
$y=-0.002x + 0.3036 (R^2=0.629)$ 式(2)
x : salinity
y : surface reflectance of ASTER band3

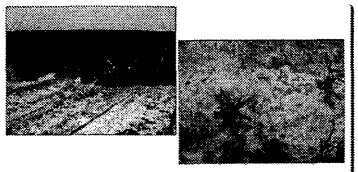
With high soil moisture
- High soil moisture
- Deposition for the surface
- Color is white

With low soil moisture
- Low soil moisture
- Solid soil
- Color is brown or dark color.



5.The Cause of saline deposit

Primary cause
An inappropriate irrigation
⇓
Deposition the salinity soil from underground
⇒ A crisis of irrigation farming



Secondary cause
Wash the salinity soil in the irrigation farmland
⇓
Accumulation for the lower reaches

6.Conclusion

Development the method for detection the saline deposit area.
We developed the new method to detect the saline deposit area.

Understand the distribution of desertification by saline deposit.
We understood the distribution of saline deposit. Moreover we compare the saline deposit area with detection change area (vegetation ⇒ bare land). The result of comparison, we understood that the cause of desertification in northern edge of Tarim basin is saline deposit.