5.Application

Alteration Mineral Detection using ASTER SWIR Data

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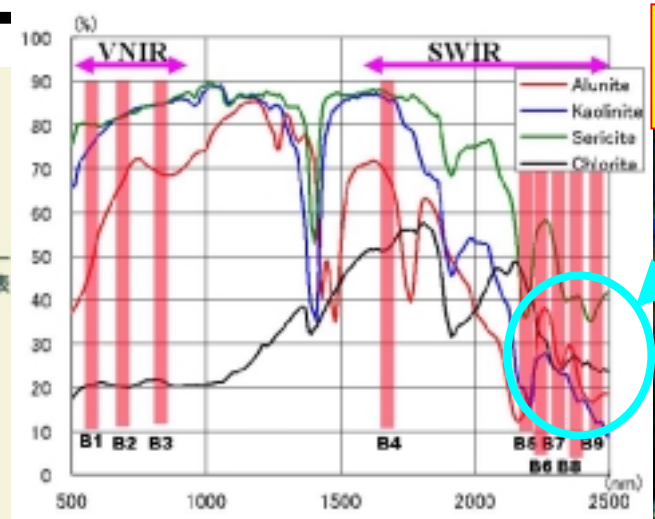
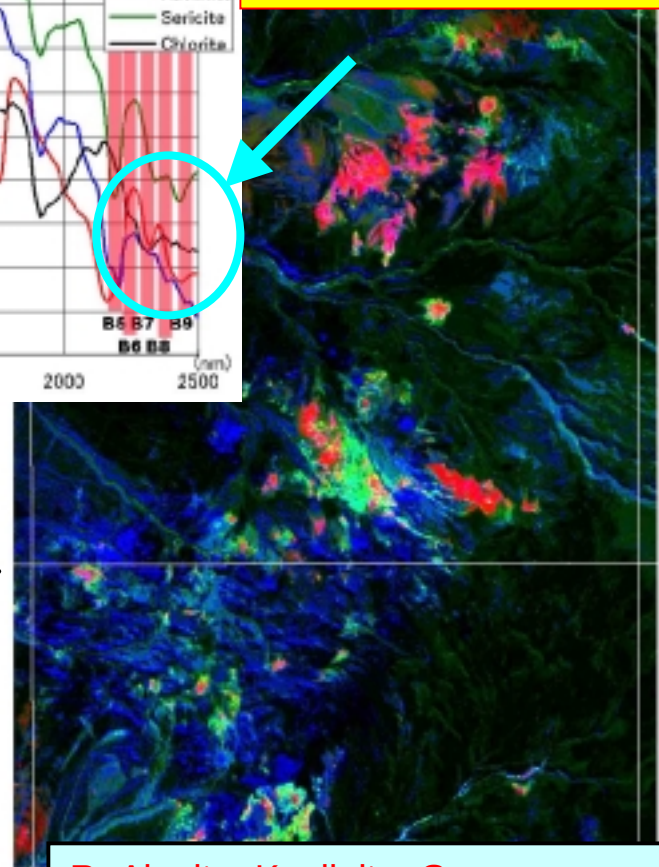
Cross Section of Porphyry Copper Ore Deposit



Spectral Feature of Clay Mineral Absorptions



South of Escondida Mine, Chile

Mineral Assemblages

R > G > B

Zoning of Minerals

R=Alunite+Kaolinite+Gypsum

G=Sericite+Montmollironite

B=Chlorite+Calcite

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Vegetation Map of the Land and Wetland

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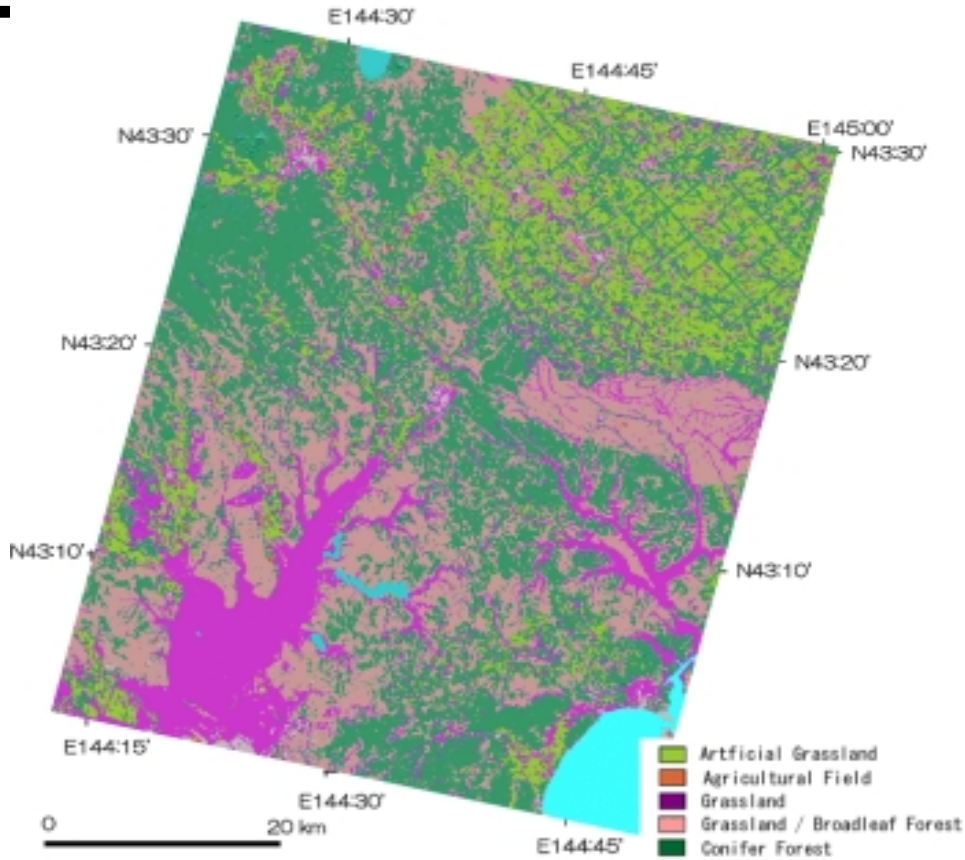
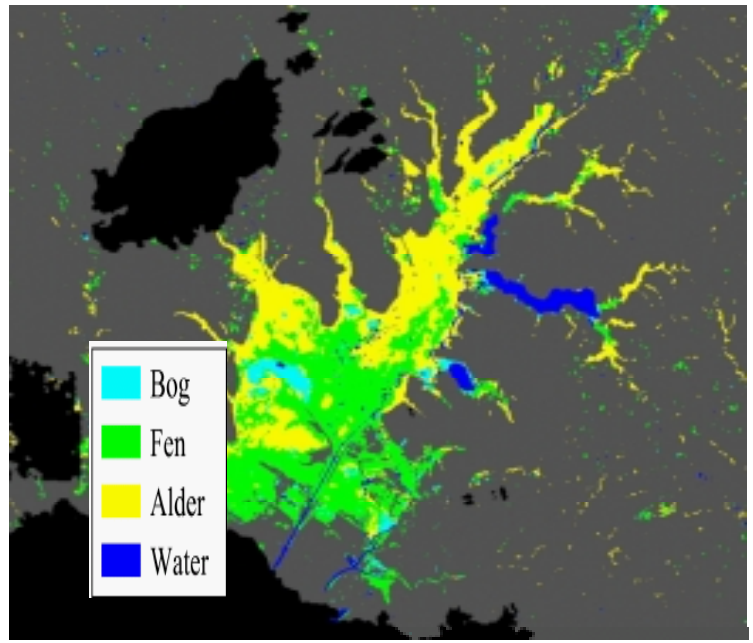
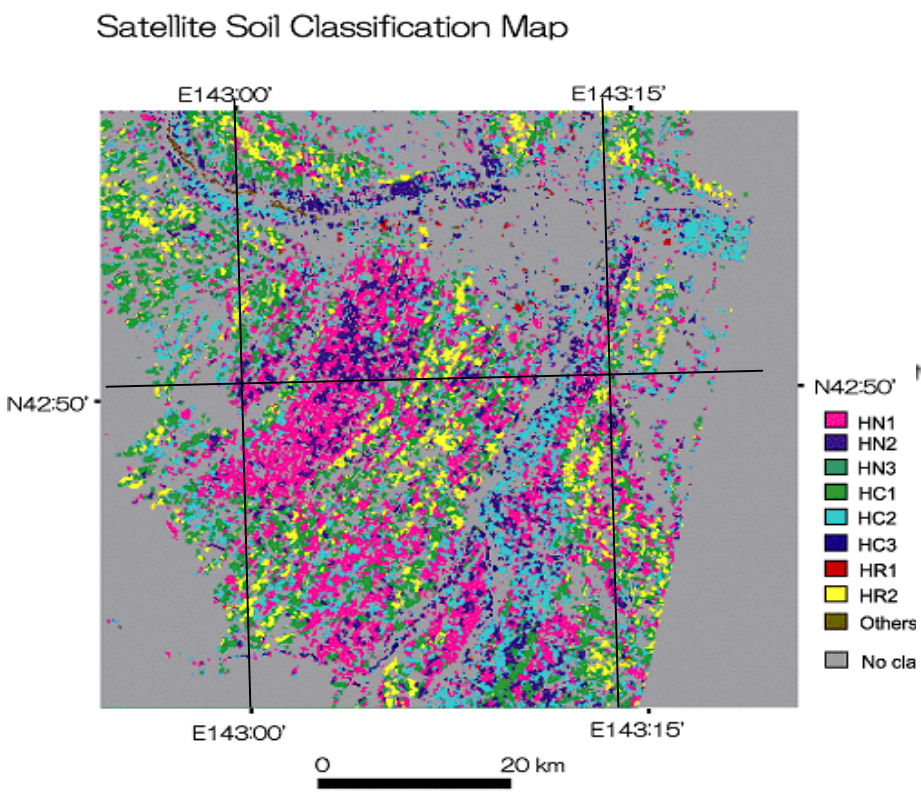


Agricultural Land Map of the Konsen Area

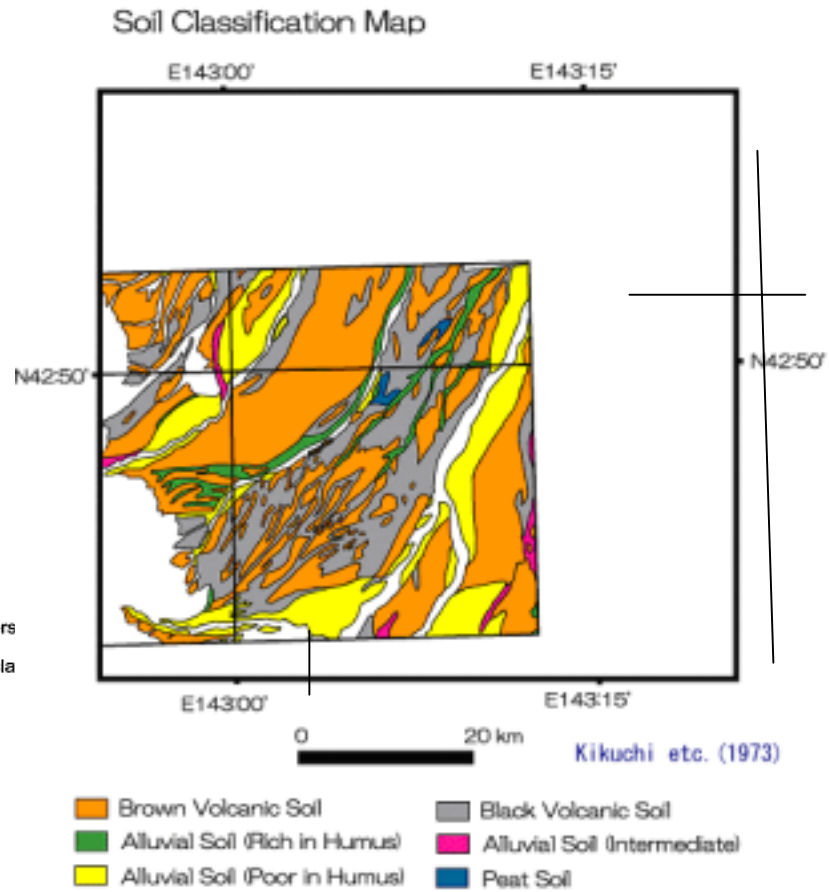


Wetland map of Kushiro Mire

Soil Classification in Agricultural Land



Soil Classification by ASTER Data Analysis



Conventional Soil Classification

Suspended Soil monitoring of Ariake Bay, Japan
(by JERS-1/OPS and ASTER Images)

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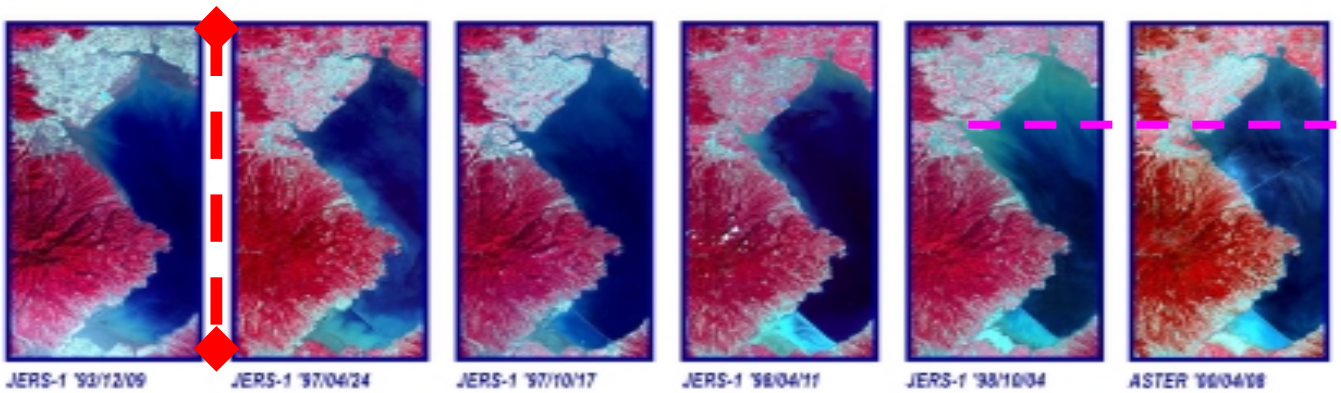
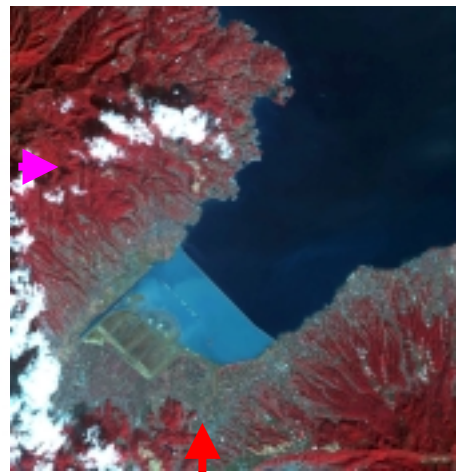
Construction of water-gate (97/4/14)





JERS-1/OPS (Spatial resolution: 18 × 23m)

ASTER/bands=1 2 3 (Spatial resolution: 15 × 15m)

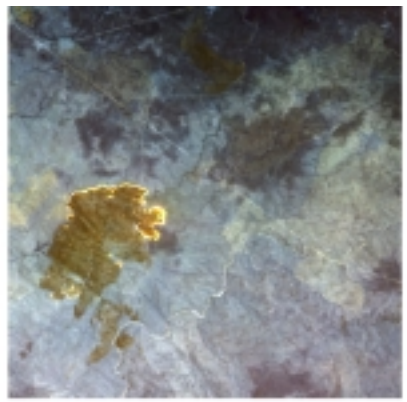
High turbidity

Forest Fire Detection by ASTER/VNIR, SWIR and TIR

(Place: Cairns, Australia, Date:25/Dec./2001)

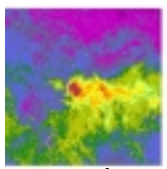
VNIR color composite

SWIR color composite

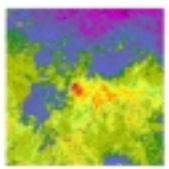


TIR color composite

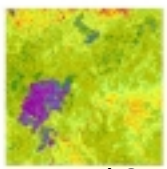
VNIR



Band 1



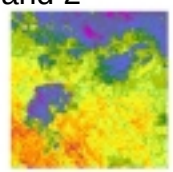
Band 2



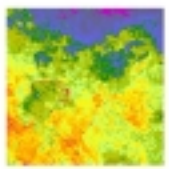
Band 3

ASTER can detect a forest fire;
VNIR shows the burned area and a plume of smoke,
SWIR shows the high temperature area (now burning), and
TIR also shows the burned area.

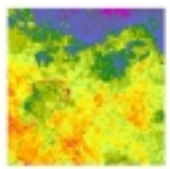
SWIR



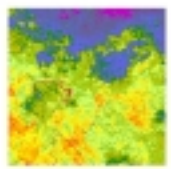
Band 4



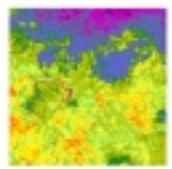
Band 5



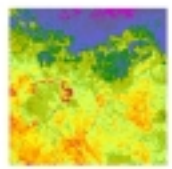
Band 6



Band 7



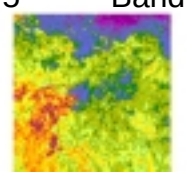
Band 8



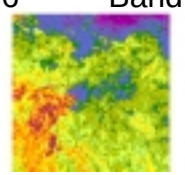
Band 9

Color sliced images
in SWIR and TIR bands
RED represents high temperature and
BLUE represents low temperature

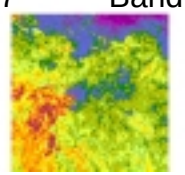
TIR



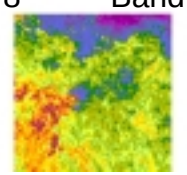
Band 10



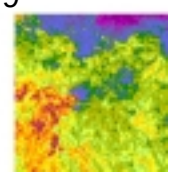
Band 11



Band 12



Band 13



Band 14

Volcano Monitoring

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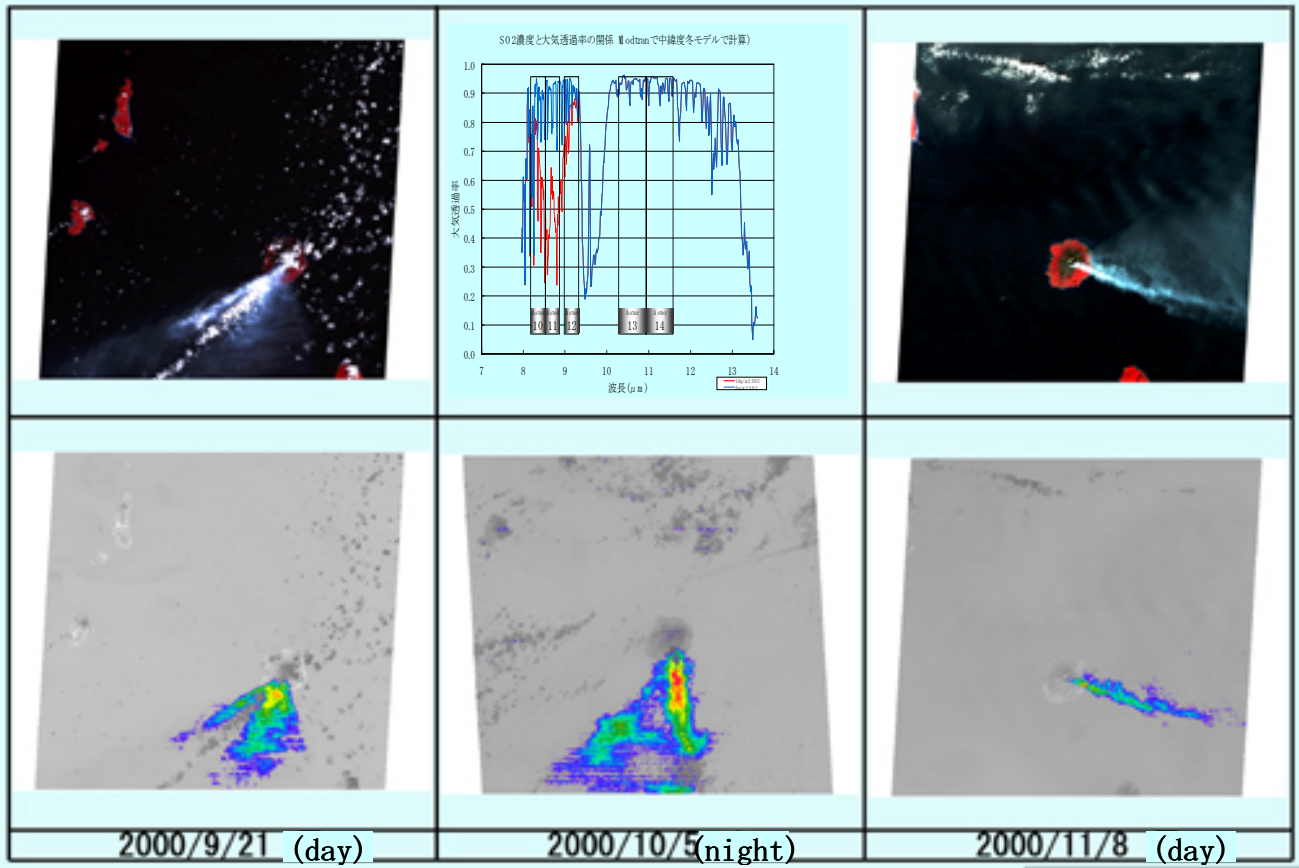
SO_2 Gas Density Map (Mt. Oyama/Miyake Island, Japan



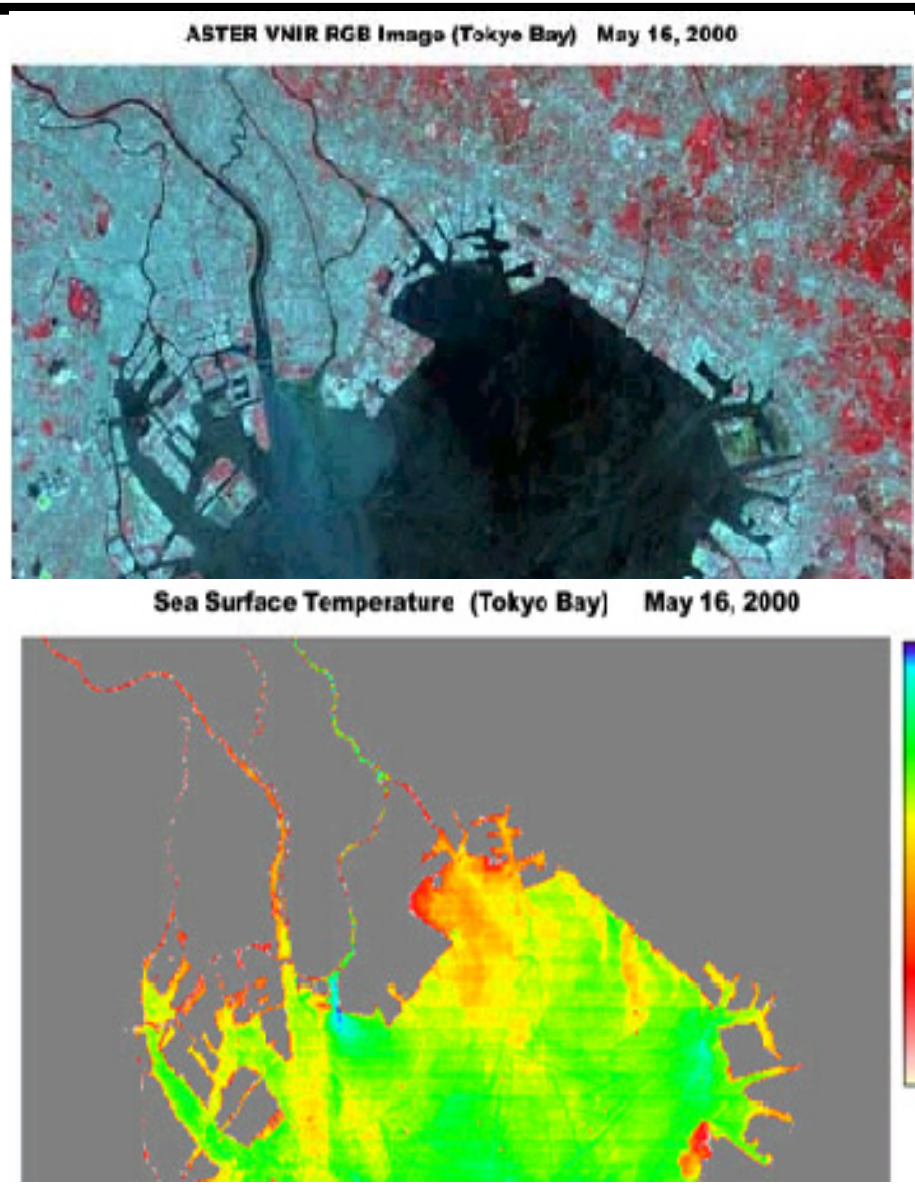
Sea Surface Temperature

ASTER

ASTER False Color Image

Northern Part of Tokyo bay

Sea Surface Temperature



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Multi temporal images of mangrove forest

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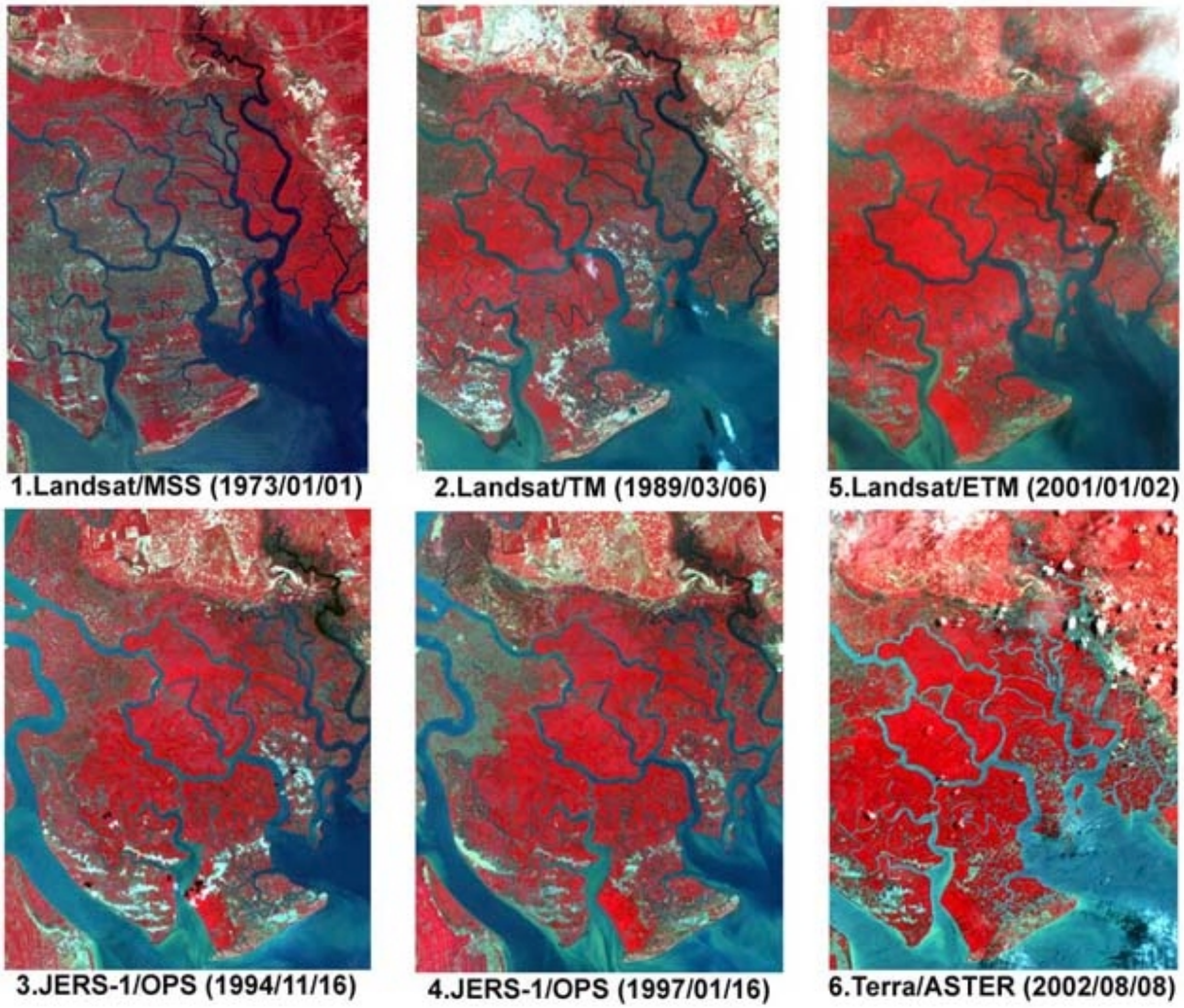
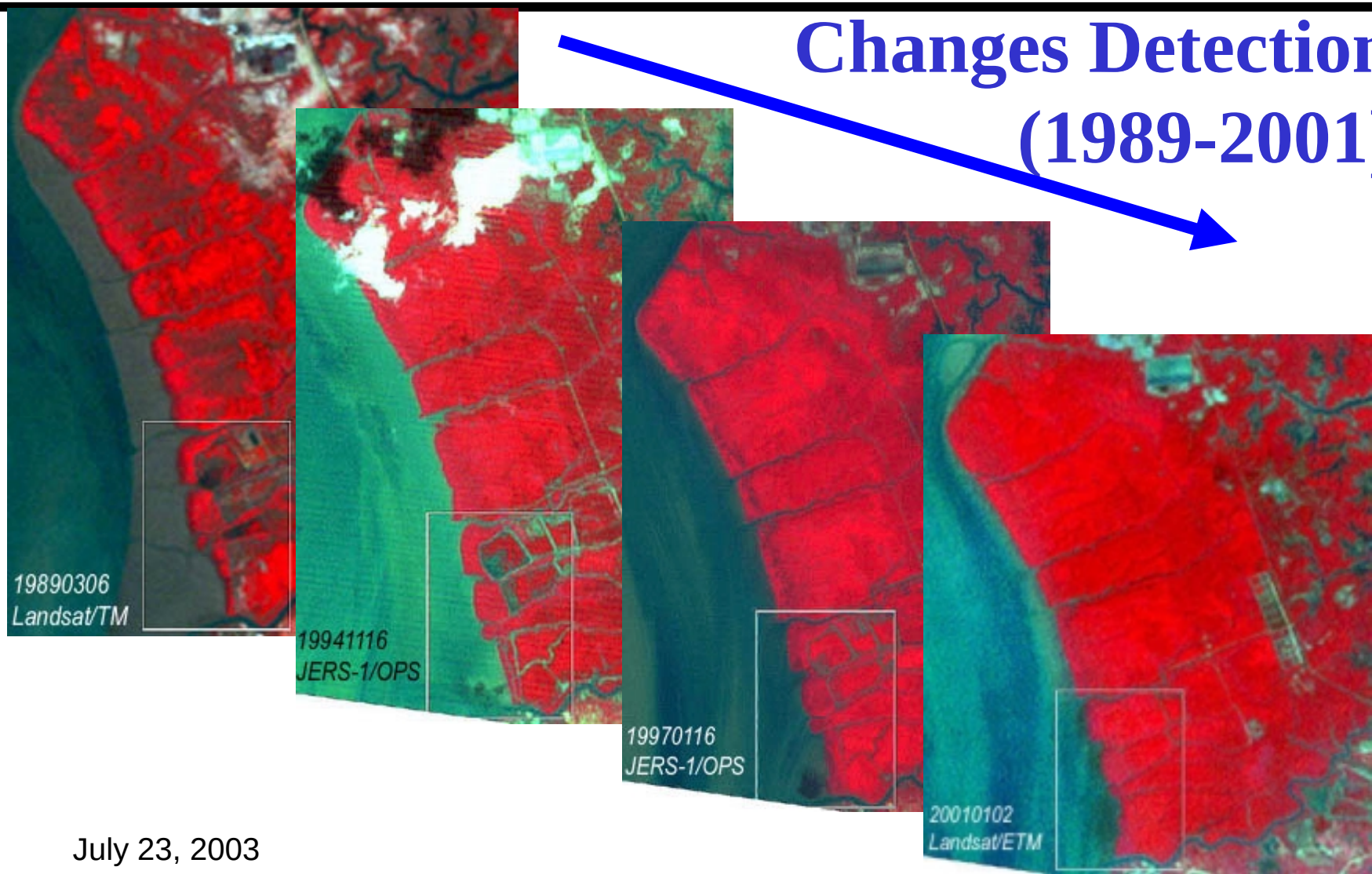
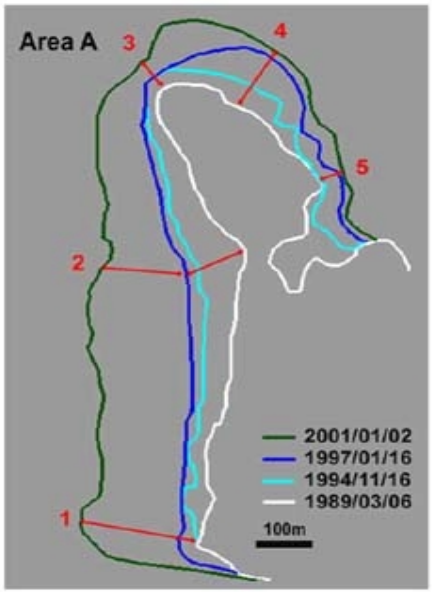


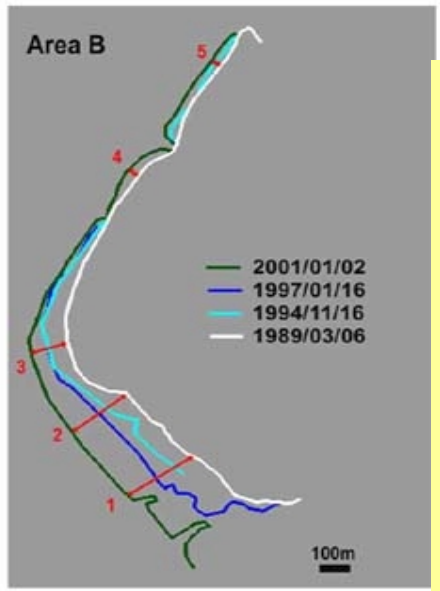
Can Gio, Vietnam

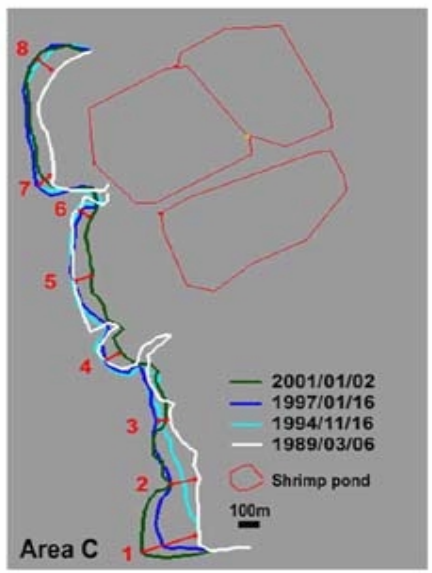
Changes Detection (1989-2001)

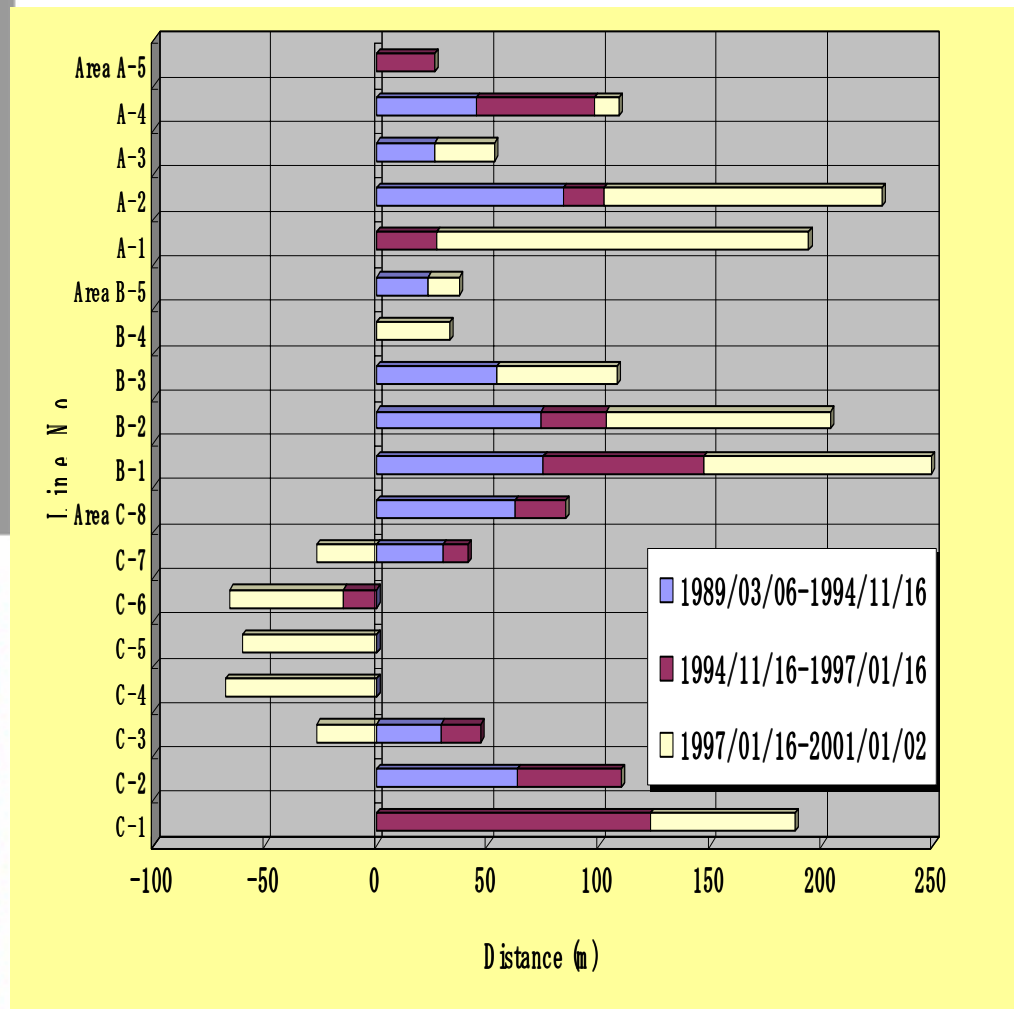


Result of changes of mangrove extent









Temperature （Source Data 1－VNIR1-3）

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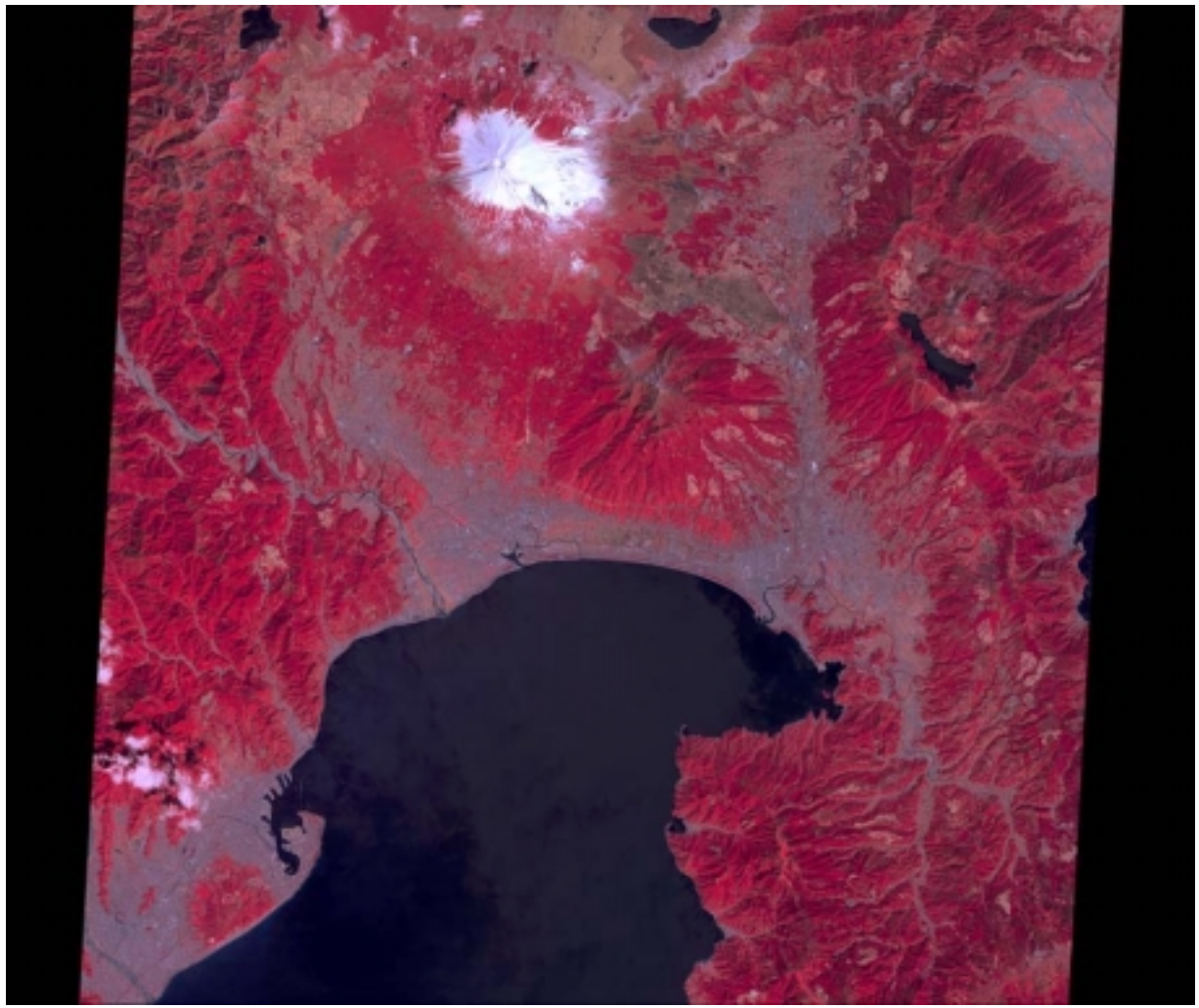

Temperature （Source Data 2　TIR 10)

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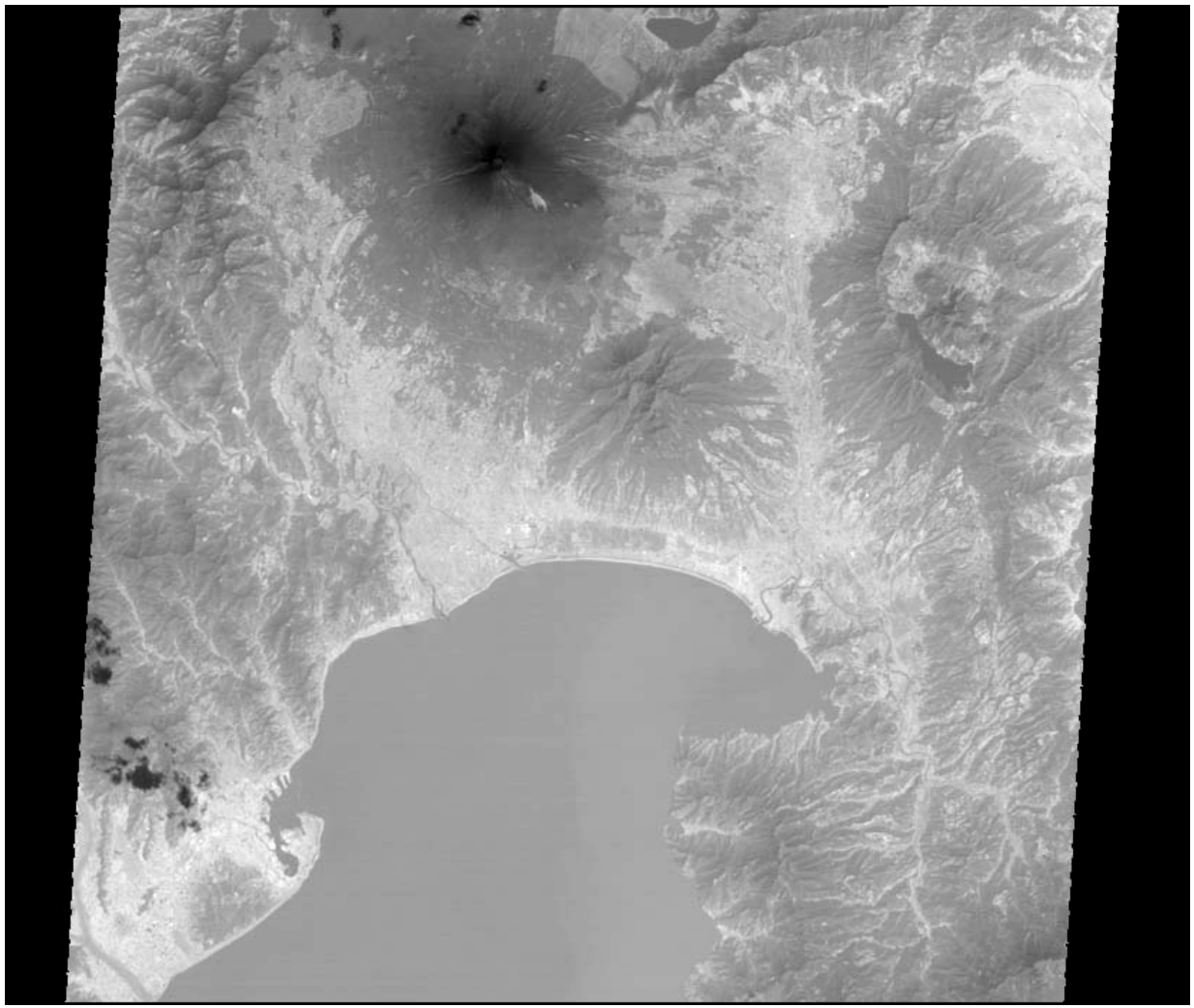

Temperature （Planck's formula 1/2)

ASTER

Apply Planck's formula to the source data to derive Absolute Temperature T.

$$T = \frac{C_2 / \lambda_n}{\ln\left(\frac{C_1}{\pi \lambda_n^{5} L} + 1\right)}$$

*"n" indicates the band number (10-14)

$C_1 = 2\pi hc^2 = 3.7418 \times 10^{-16} (Wm^2)$

$C_2 = hc/k = 1.4388 \times 10^{-2} (mK)$

$L = (DN_n - 1) R_n$

h: Planck's constant (6.626176×10-34)

k: Boltzmann's constant (1.380662×10-34)

c: Speed of light (2.997925×108)

DN: DN value in Level 1B product

L: Radiance W/(m2･sr･m)

Temperature （Planck's formula 2/2)

ASTER

Band (n)	λ min	λ max	λ n	R n
10	8.125×10-6	8.475×10-6	8.30×10-6	6.882×103
11	8.475×10-6	8.825×10-6	8.65×10-6	6.780×103
12	8.925×10-6	9.275×10-6	9.10×10-6	6.590×103
13	10.25×10-6	10.95×10-6	10.6×10-6	5.693×103
14	10.95×10-6	11.65×10-6	22.6×10-6	5.225×103

Temperature

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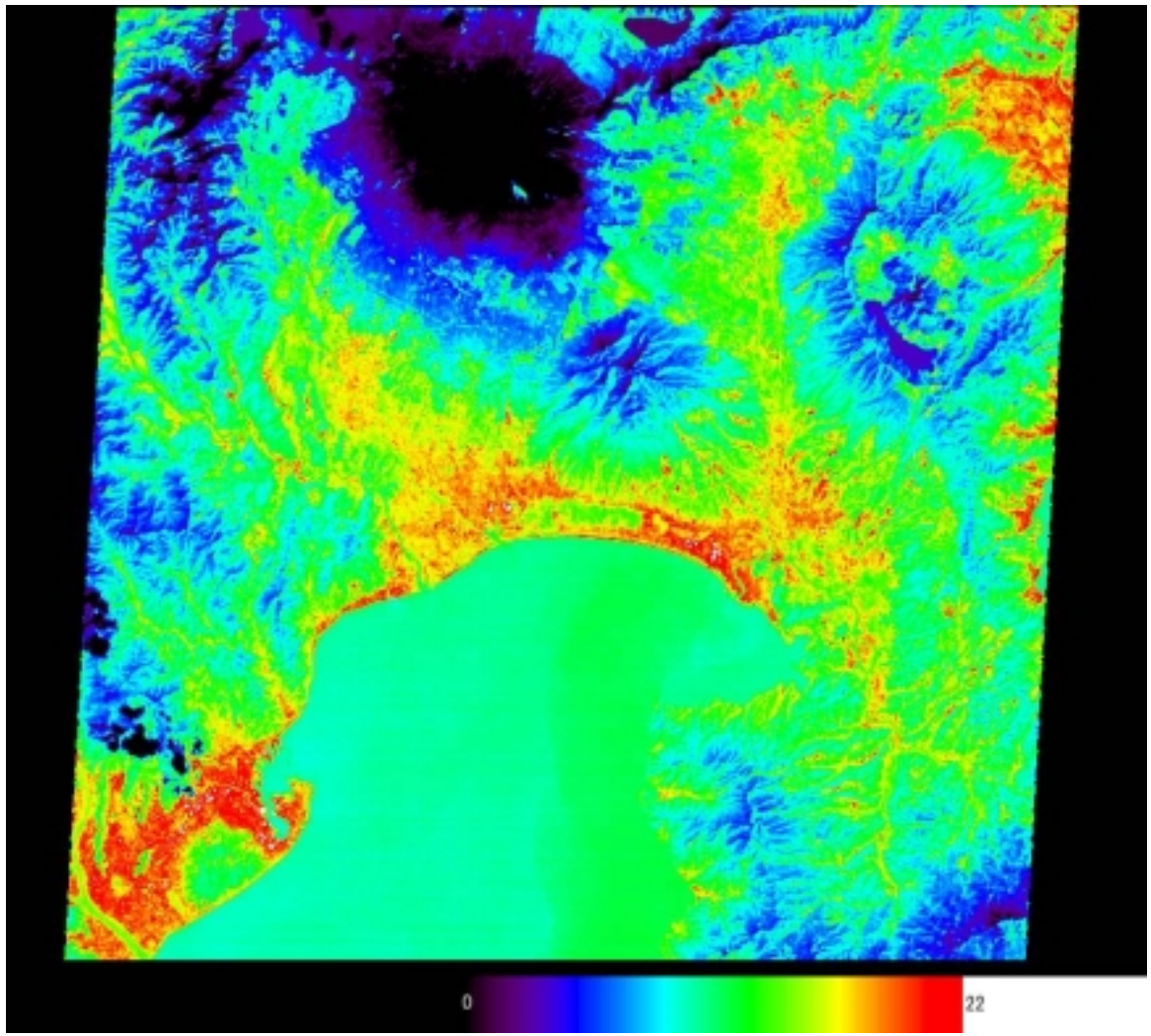

2001/3/10