# Geo-spatial Database and Damage Assessment

Group 4

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# Objectives

✓ Development of building inventory data in target cities using satellite images

✓ Construction of digital elevation model (DEM) to evaluate slope failure

✓ Development of damage detection technique using satellite images

✓ Damage assessment for scenario earthquakes

Target cities:
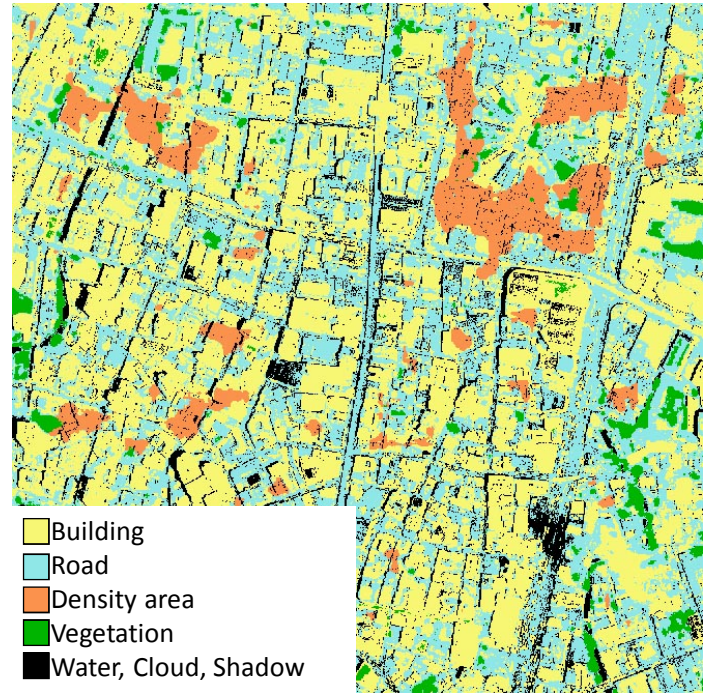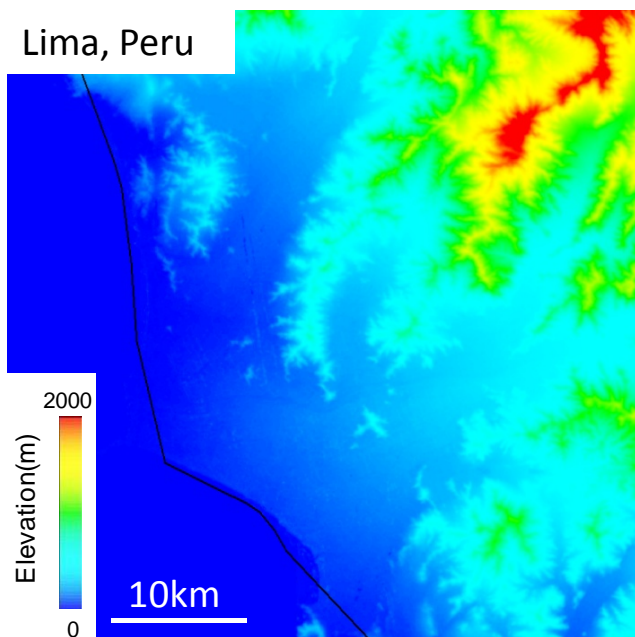Lima, Pisco and others

# Development of Building Inventory Data



High-resolution Satellite Image
in Urban Area



Building
Road
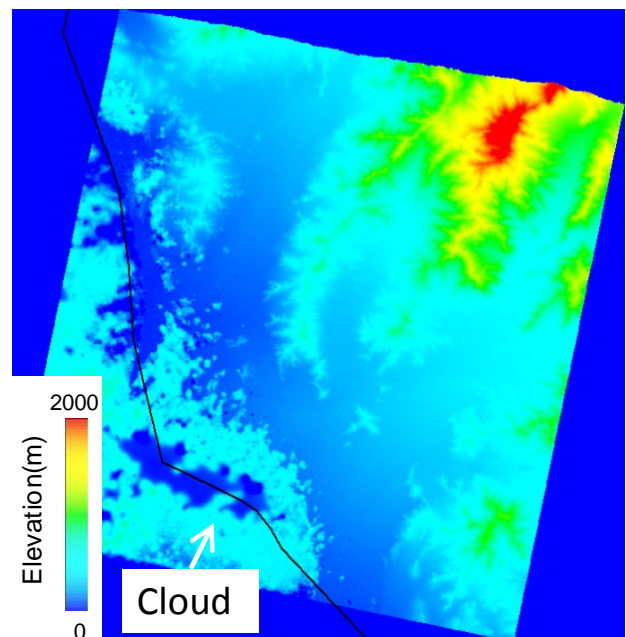Density area
Vegetation
Water, Cloud, Shadow

Building Density Classification
Land Surface Classification

Existing census data (INEI) and block-level GIS data (IGN) are also used for calibration and validation.

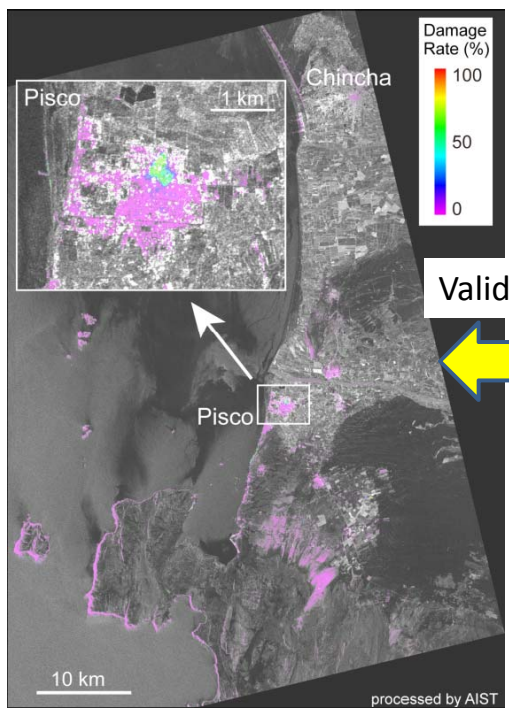# Construction of Digital Elevation Model (DEM)



Lima, Peru

Elevation(m)

2000

0

10km

Digital surface model from ASTER
(30m-resolution)



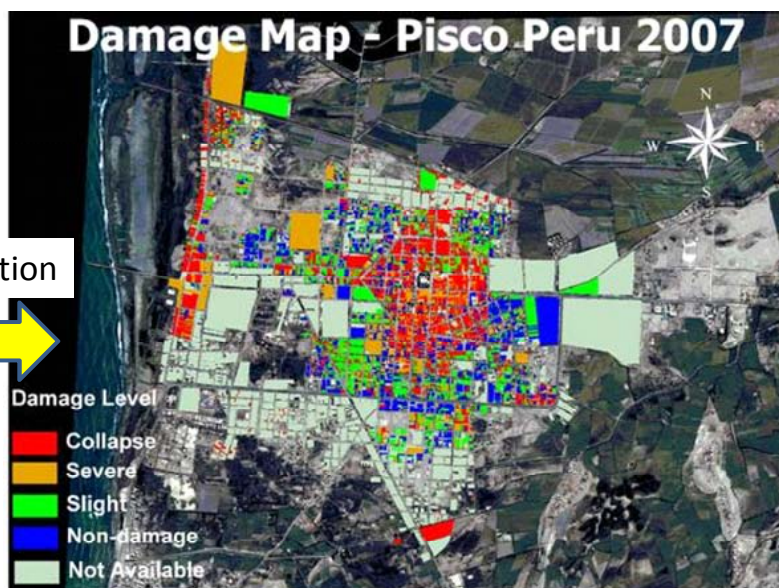Elevation(m)

2000

0

Cloud

Digital surface model from ALOS/Prism
(2.5m-resolution)

Potential of slope failure and distribution of site amplification of surface ground can be evaluated using digital elevation model.

# Development of Damage Detection Technique



Validation

**Damage Map - Pisco Peru 2007**

Damage Level
- Collapse
- Severe
- Slight
- Non-damage
- Not Available

Damage survey by CISMID

Target= 2007 Pisco and 2010 Chile earthquakes

Damage map estimated from satellite images

Satellite image-based damage detection technique suitable for Peruvian/Latin American buildings is developed.

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# Seismic Damage Assessment using GIS Technology



**Building inventory data**

**Digital elevation model**

**Seismic Hazard**
G1

**Vulnerability of buildings**
G3

Small Damage
Moderate Damage
Extensive Damage
Collapse

**Damage**