Earthquake/Landslide in Asia and pacific Region

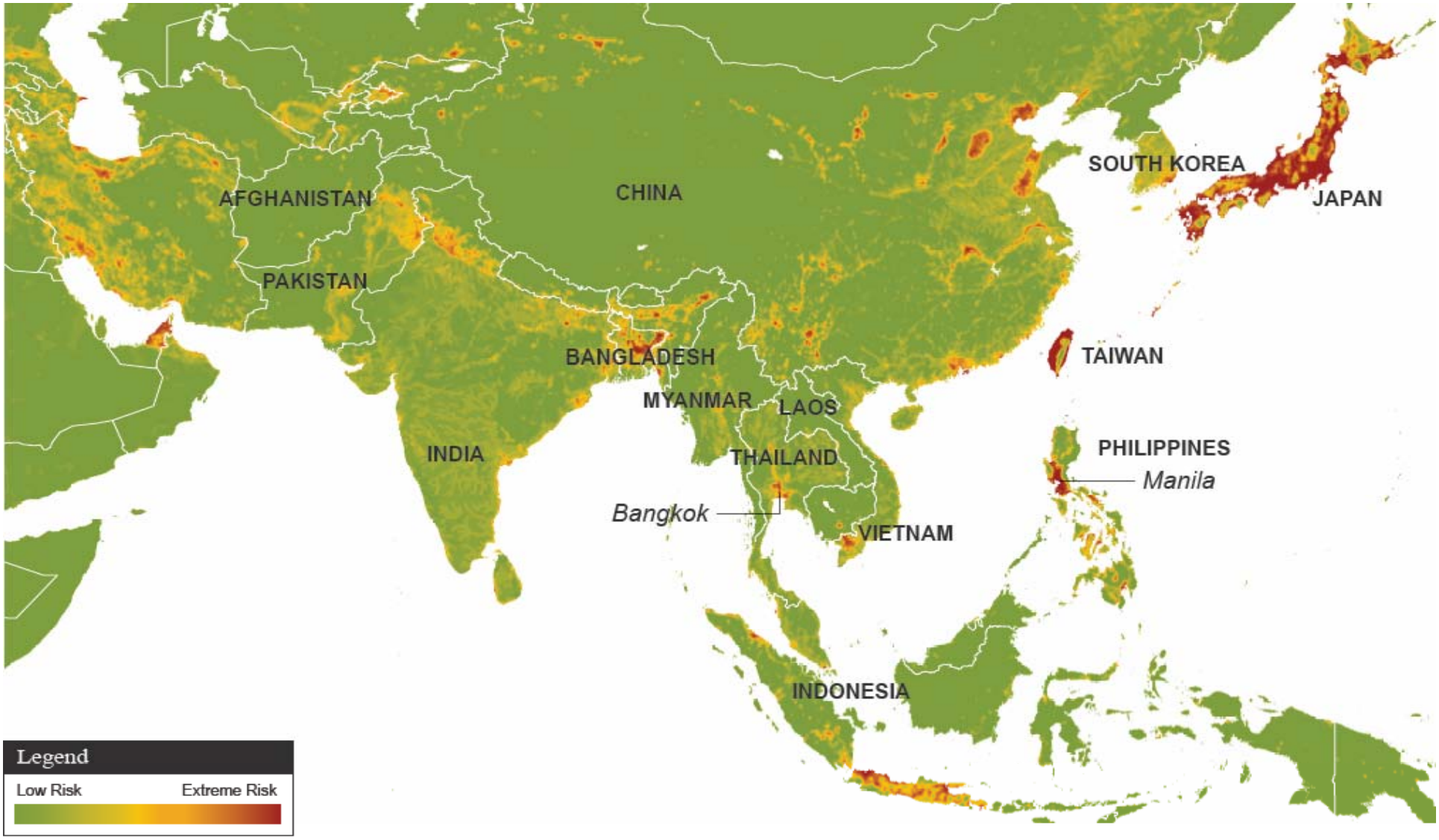
1st Joint Project Team Meeting For Sentinel Asia
STEP 3 (JPTM13)

27 - 29 November 2013, Bangkok, Thailand

Wazir Khan, General Manager
SUPARCO

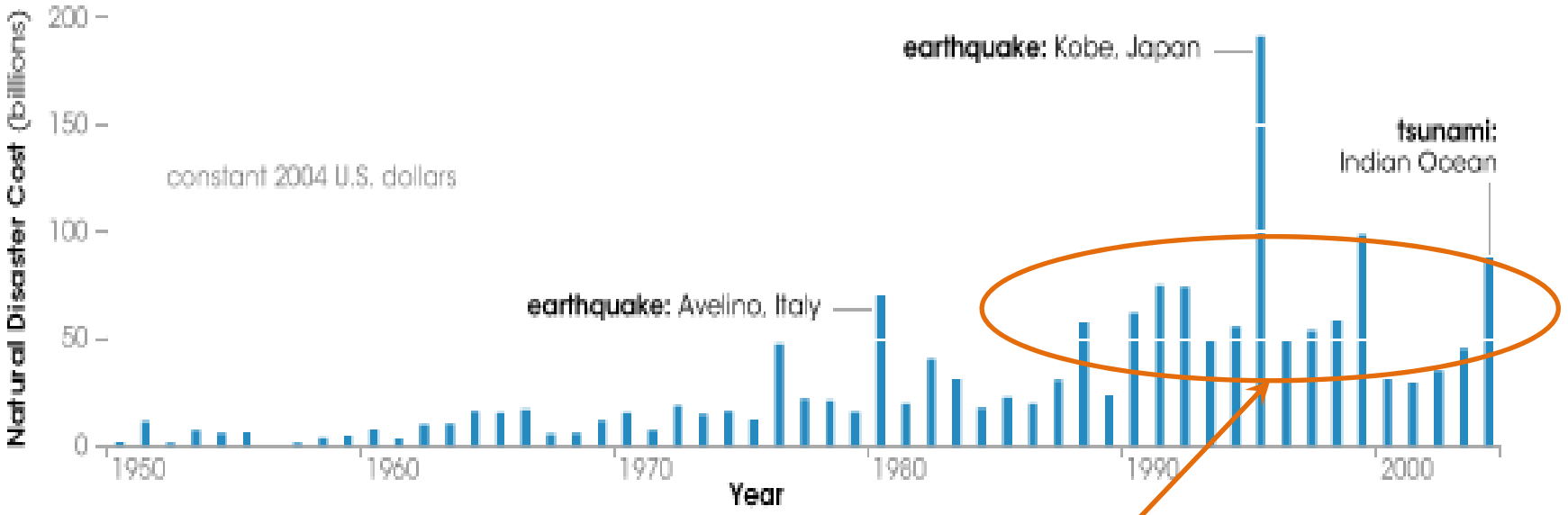
Asia Natural Hazards Risk

Economic Exposure 2012



Natural Disasters

The Rising Costs For Mankind

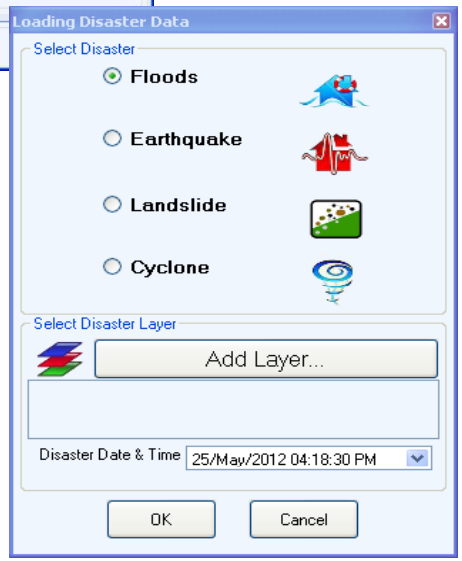


Graph by **Robert Simmon**, based on data (Upto **2005**) courtesy EM-DAT: The OFDA/CRED International Disaster Database (www.em-dat.net) Université Catholique de Louvain—Brussels, Belgium

Average Cost is beyond 50 Billion USD

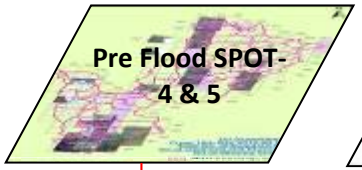
Advanced Technologies like Remote Sensing could help in lowering these costs

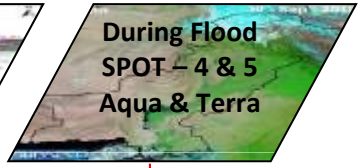
Damage Assessment Methodology

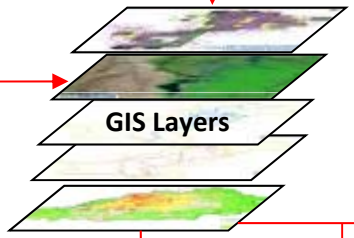


Historical Data Collection

Data conversion and standardization





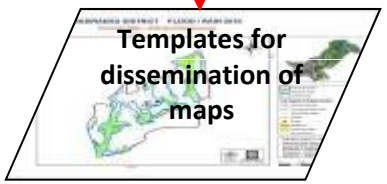


Precise Flood extent

Daily Flood extent

Detailed Damage Assessment

Rapid Damage Assessment



Natural Disasters

Earthquake/Landslides (2005-2013)

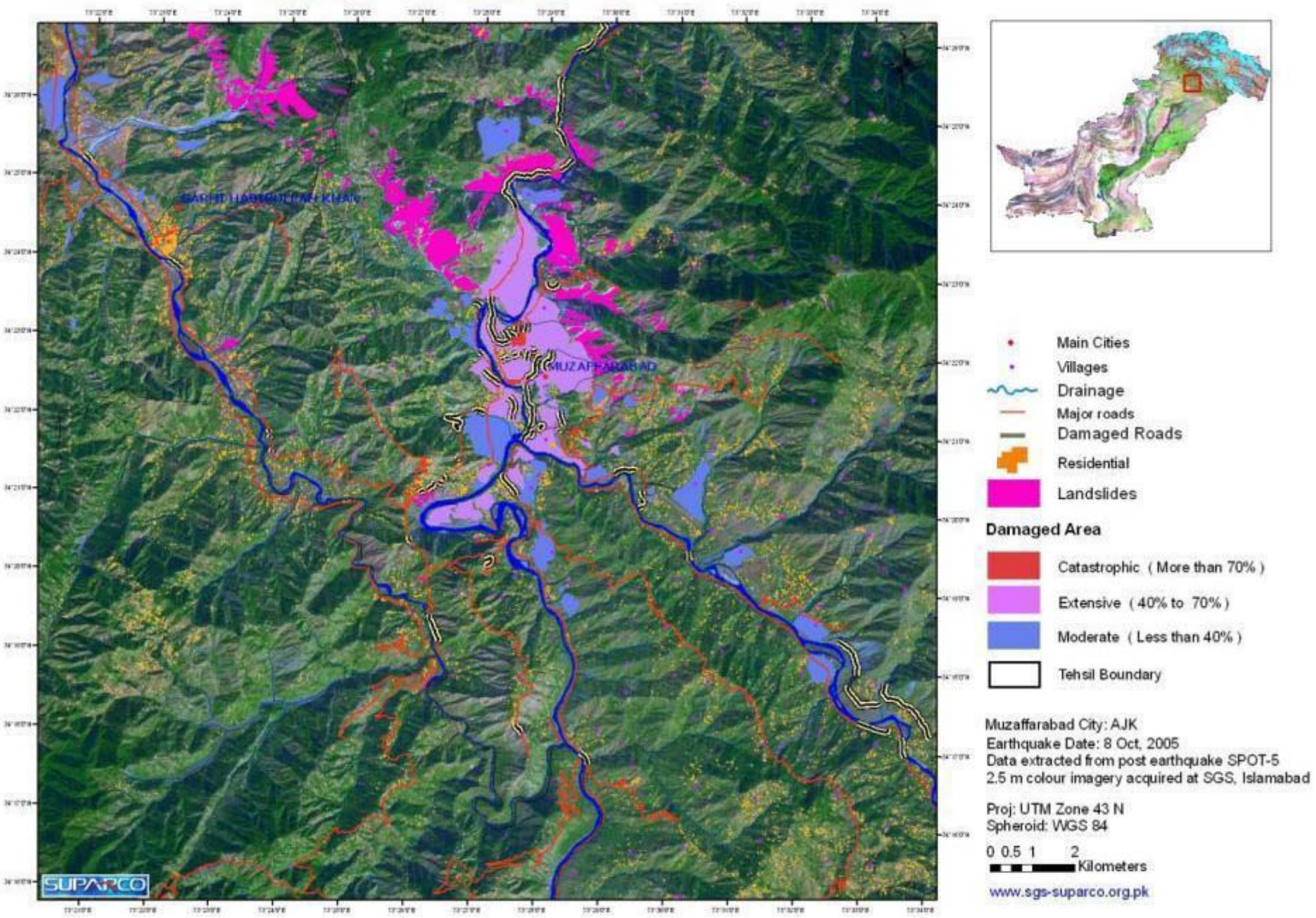
- October 8, 2005 at 08:52:37 PST
- 79,000 dead, 106,000 injured
- 17th deadliest earthquake of all time


Balakot
15 Feb 2004

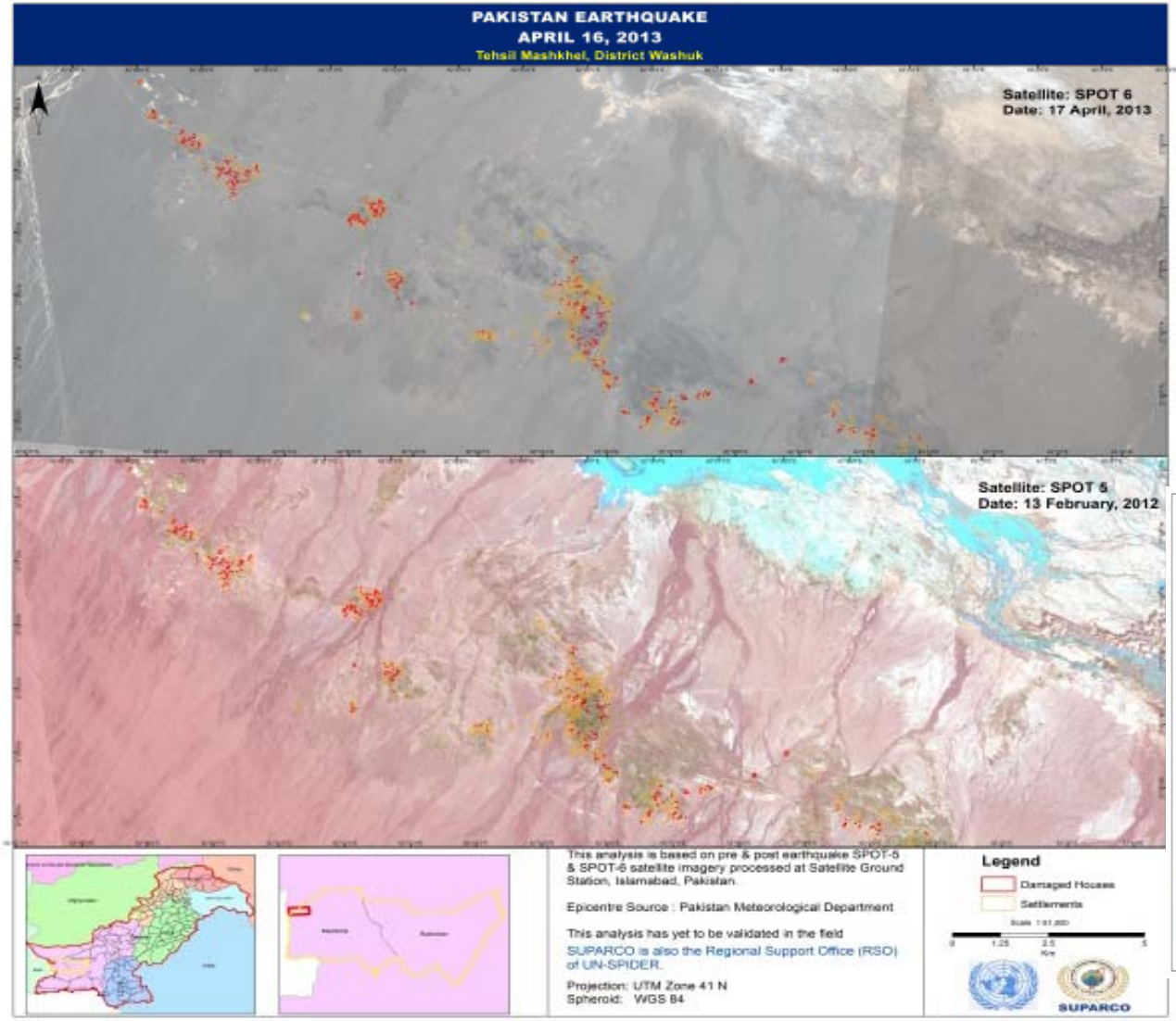

Balakot
13 Jun 2006

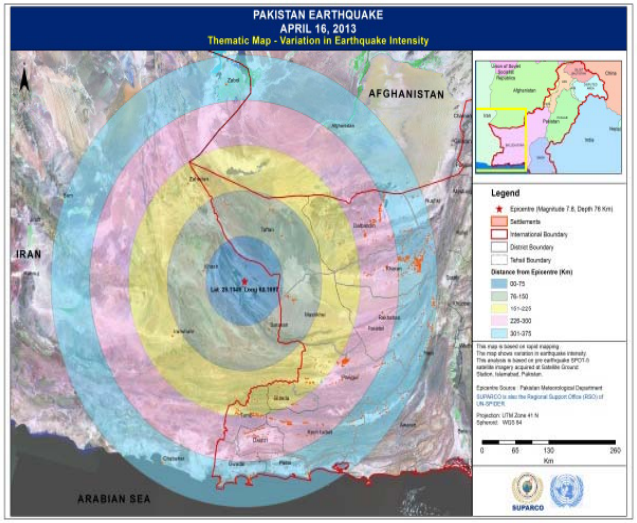

Balakot
06 Apr 2010

Muzaffarabad City

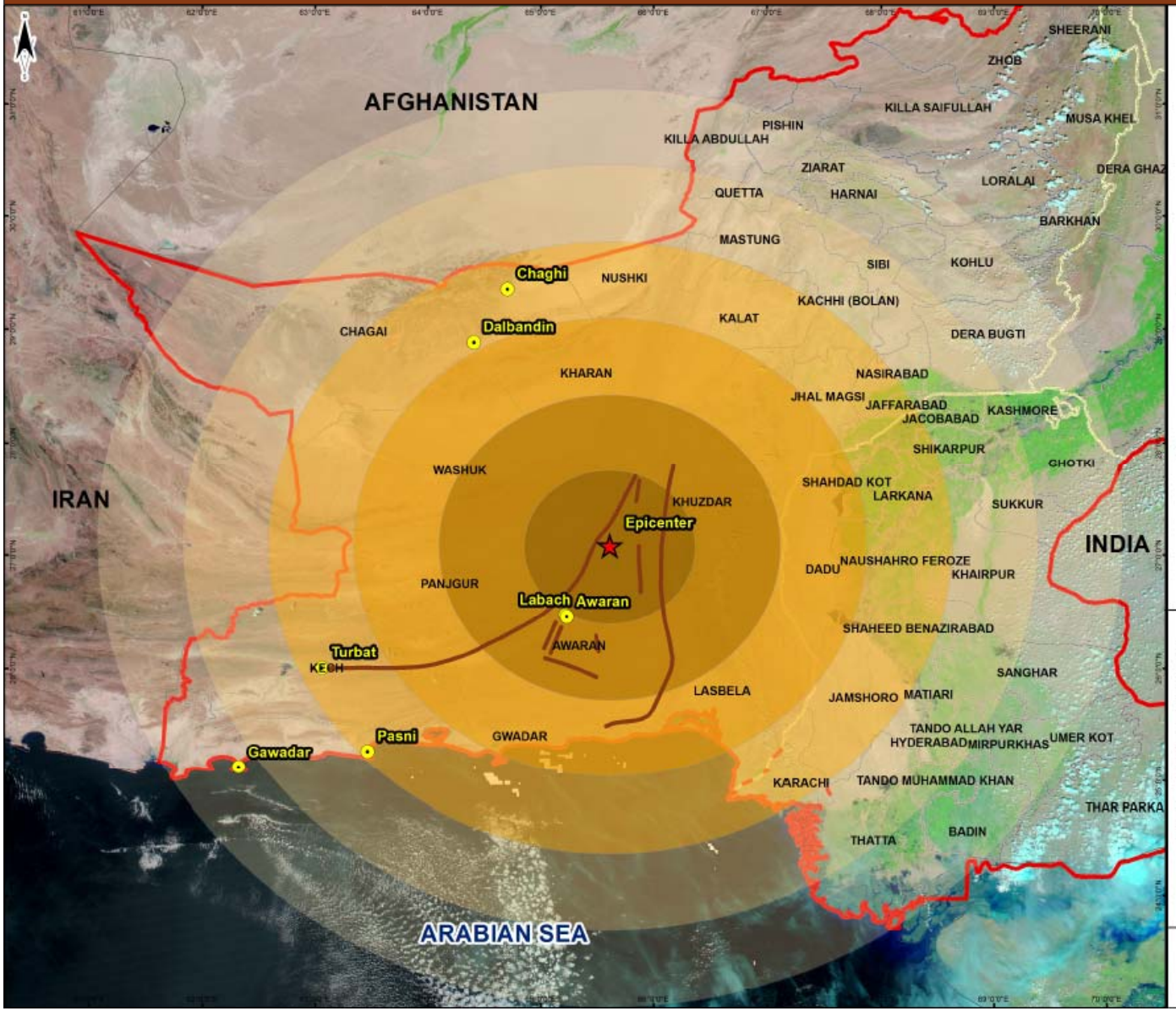


Earthquake April, 2013





PAKISTAN EARTHQUAKE, SEPTEMBER 24, 2013



Legend

- Epicentre
- Major City
- Active Fault Line
- International Boundary
- District Boundary

Distance from Epicenter (in km)

- 0-75
- 76-150
- 151-225
- 226-300
- 301-375
- 376-450

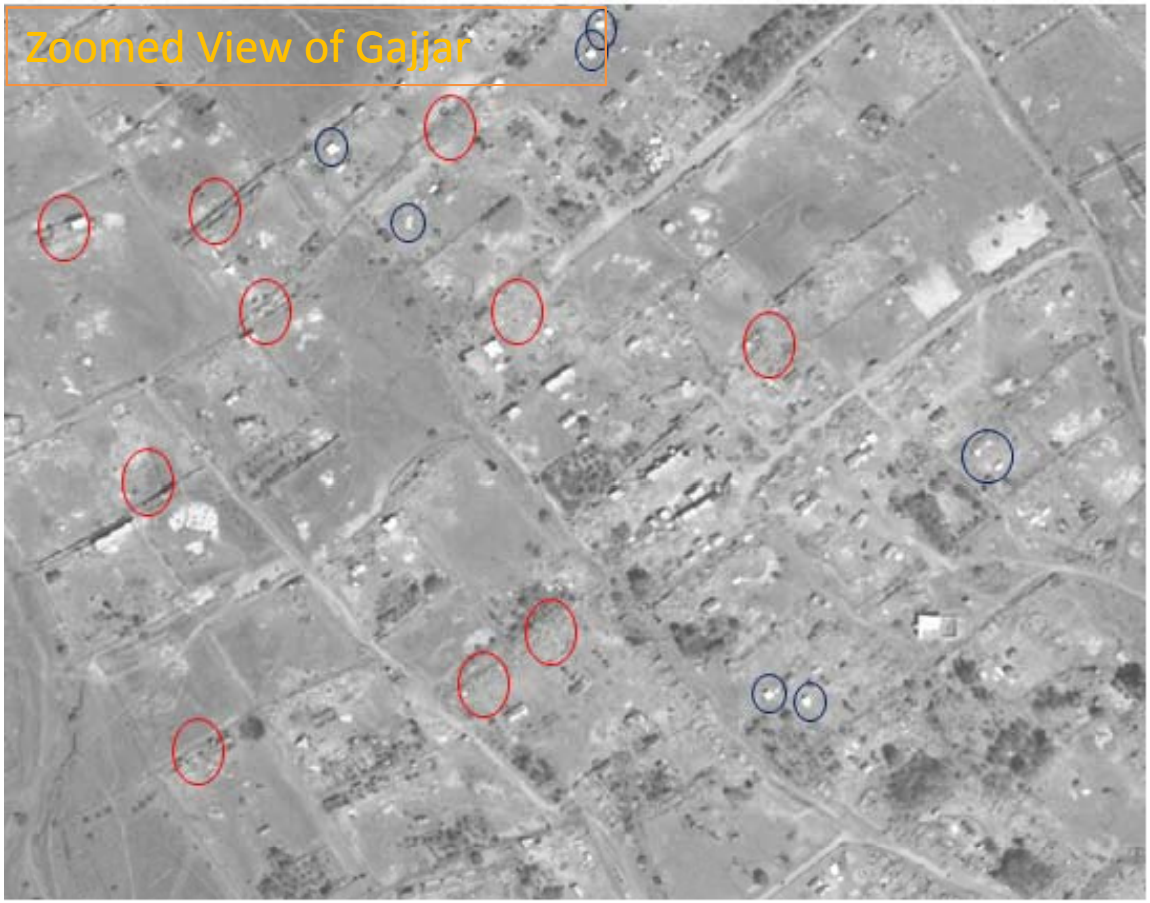
This is a rapid map based on pre-earthquake MODIS imagery of Sept 23, 2013. There are several active fault lines near the epicenter located in District Awaran (Balochistan). Magnitude of the earthquake was 7.7 while the depth was 10 Km. This map is created on September 24, 2013 at SUPARCO.

Data Sources: PMD, GSP
Projection & Datum: WGS 84

1:3,750,000
0 25 50 100 150 200
Kilometers

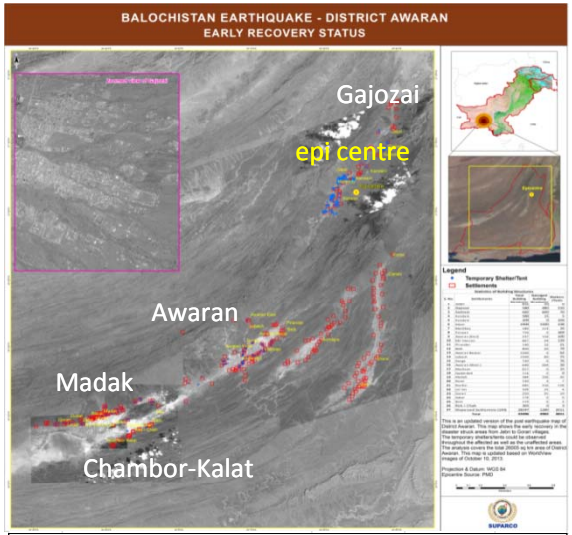
SUPARCO

EARTHQUAKE Sep, 2013
EARLY RECOVERY STATUS



Legend:
Damaged Structures
Temporary Shelters/Tents

Gajjar:
Damaged Structures : 1500
Temporary Shelters/Tents: 238



Statistics of Building Structures

S. No.	Settlements	Total Building Structures	Damaged Building Structures	Shelters /Tents
1	Jebri	831	50	0
2	Gajozai	580	480	210
3	Sadozai	682	600	70
4	Kandani	580	15	5
5	Kandam	200	0	104
6	Gajar	1900	1500	238
7	Mashkay	180	113	16
8	Parwan	750	0	369
9	Awaran (East)	237	134	100
10	Mir Hassan	867	24	146
11	Pirandar	140	16	21
12	Bedi	800	20	148
13	Awaran Bazaar	1500	0	62
14	Labach	1500	80	312
15	Dargo	720	0	89
16	Awaran (West)	640	284	194
17	Mashian	817	0	40
18	Qadardad	114	0	22
19	Madak	384	106	36
20	Razai	120	4	7
21	Nurdin	685	156	128
22	Lal Jan	109	25	4
23	Gorari	250	95	10
24	Sokal	179	0	0
25	Bani	119	0	3
26	Rek-i-Chah	365	0	3
27	Dispersed Settlemets (243)	28247	1280	2671
	Total	43496	4982	5008

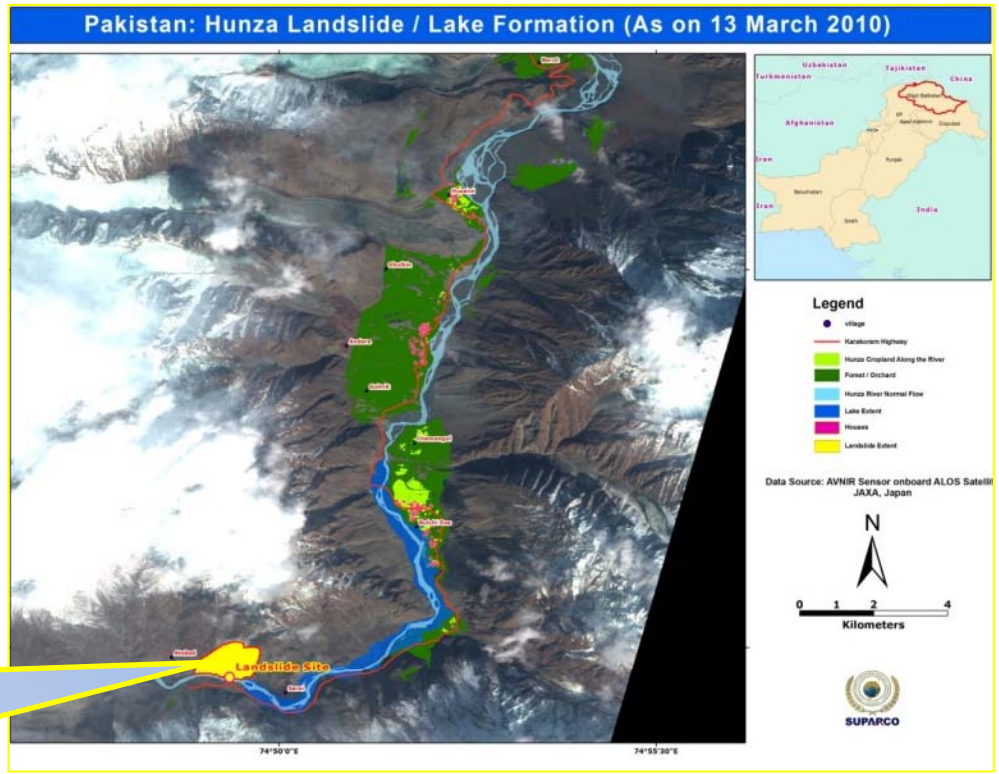
Pre & Post EQ Imagery of Gajjar, District Awaran

Temporary Shelters in Gajjar, District Awaran

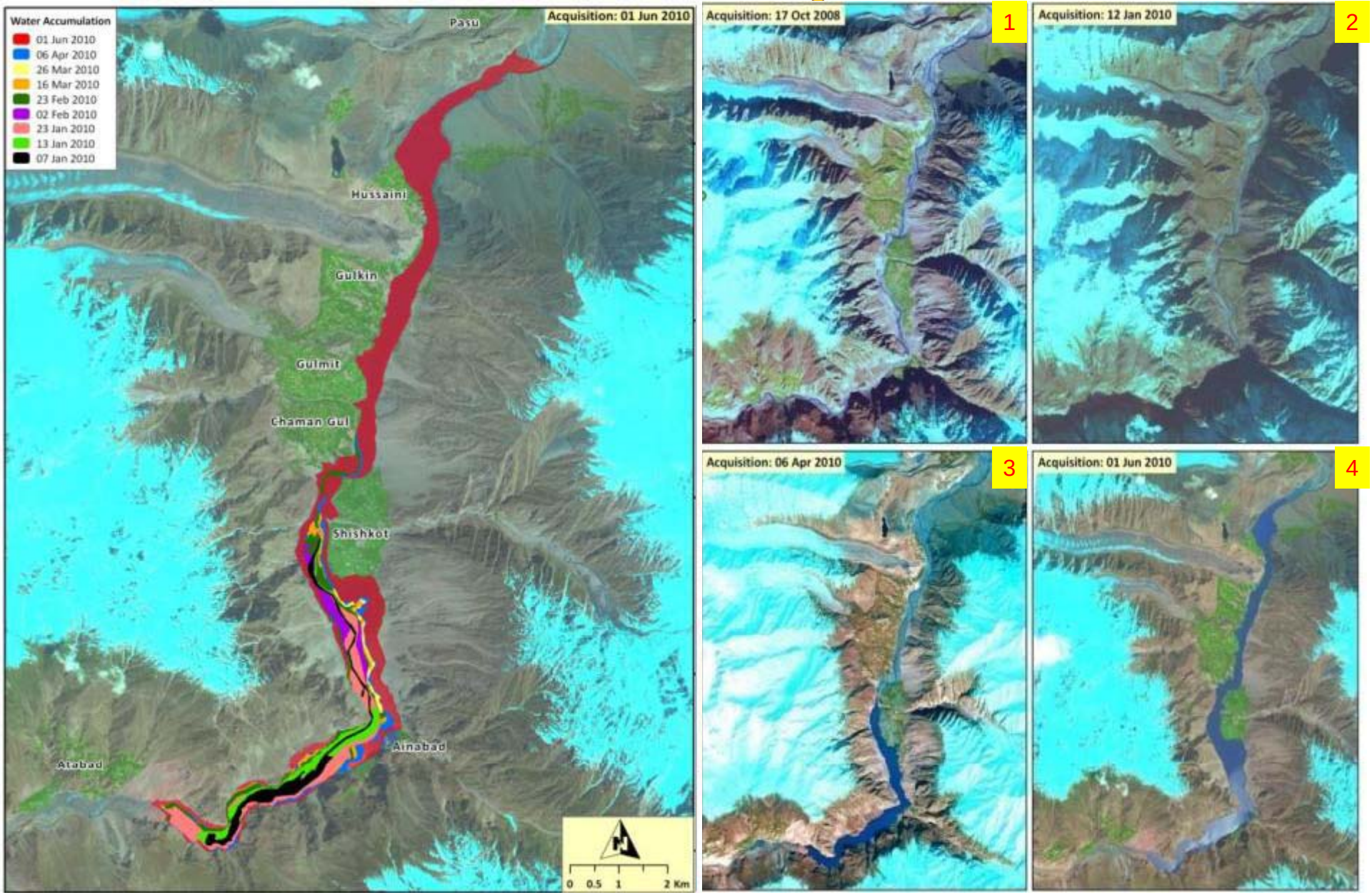
Hunza Landslide in Pakistan

Area : Landslide approx 1 km^2
Dated: 4th January 2010
Damages: blocked river started accumulating water and inundating nearby villages

Data Source : ALOS Satellite image



Temporal Analysis of Water Accumulation (Ataabad)



3-D View of Ataabad

HUNZA LANDSLIDE – 3D FLYTHROUGH

Conclusion

- Many countries of the Asia-Pacific region are located along, or adjacent to, Seismic Zone. Also most of the countries in the region experience earthquake every year. Therefore, we need to share our experience, expertise and knowledge to monitor and mitigate its impacts effectively by application space technologies.

- Landslides occur frequently in the hilly and mountainous parts of the Asia-Pacific region every year. In addition to the influence of topography, landslides are aggravated by human activities, such as deforestation, cultivation and construction, which destabilizes the already fragile slopes. Effective utilization of Space Technology can help reduce the damages caused due to Landslides.

- SUPARCO shall keep to support all regional and international efforts initiated for minimizing the damages and sufferings face up to mankind in the event of natural disasters.
- Keeping in view the importance and frequent occurrence, it is proposed that Earthquake and Landslide WG may be established in sentinel Asia.

Thanks