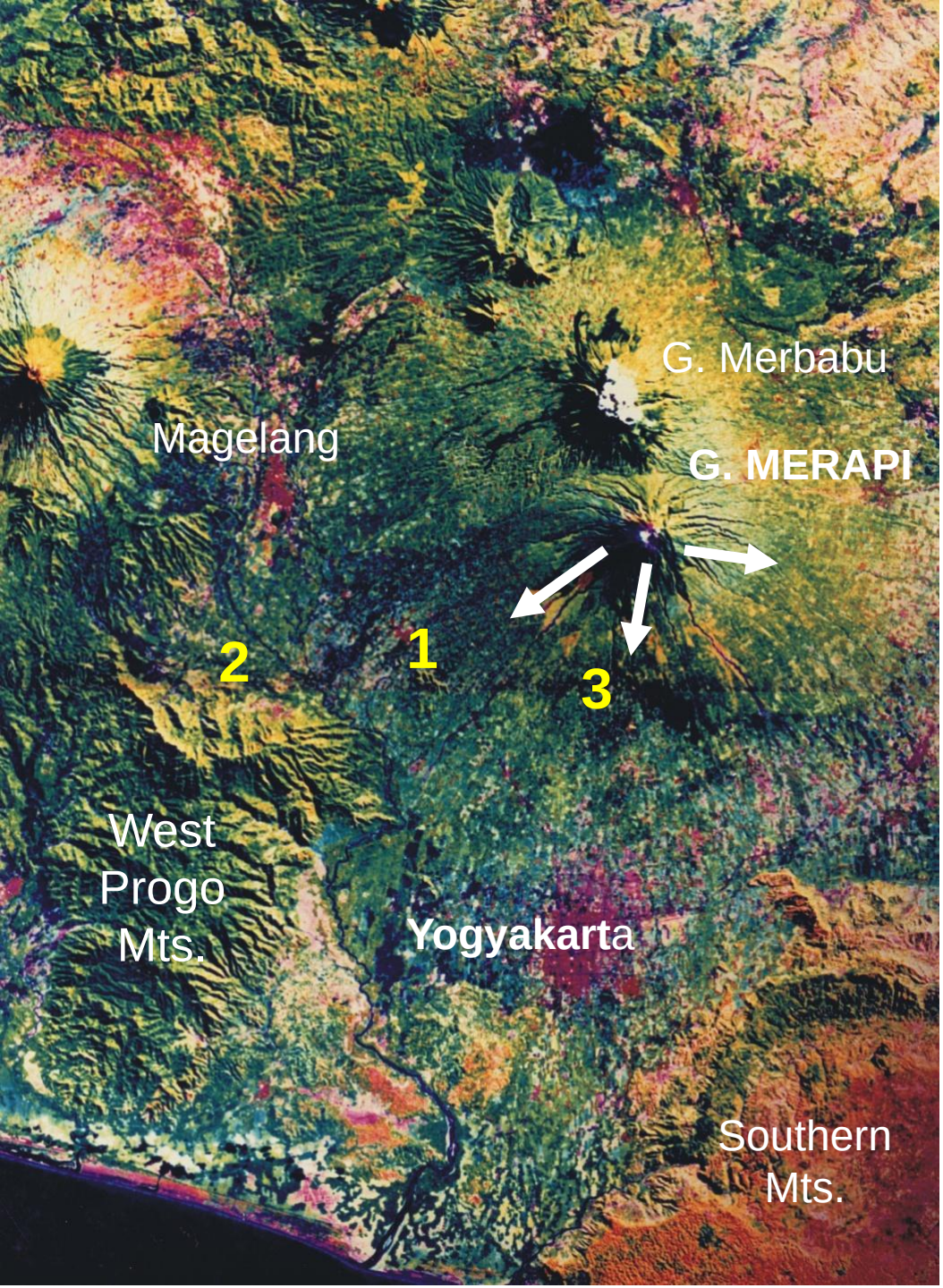
MERAPI & BOROBUDUR TRIP

- Preparation: sun hat, long sleeves, sport shoes
- Depart from hotel at 07.30 LT, by bus
- Arrive at Hotel at 17.00 LT
- Detailed schedule is presented in the guide book



Merapi Volcano & Yogyakarta

Stop sides for field trip

1.Putih River

2.Borobudur Temple

3.Merapi Museum

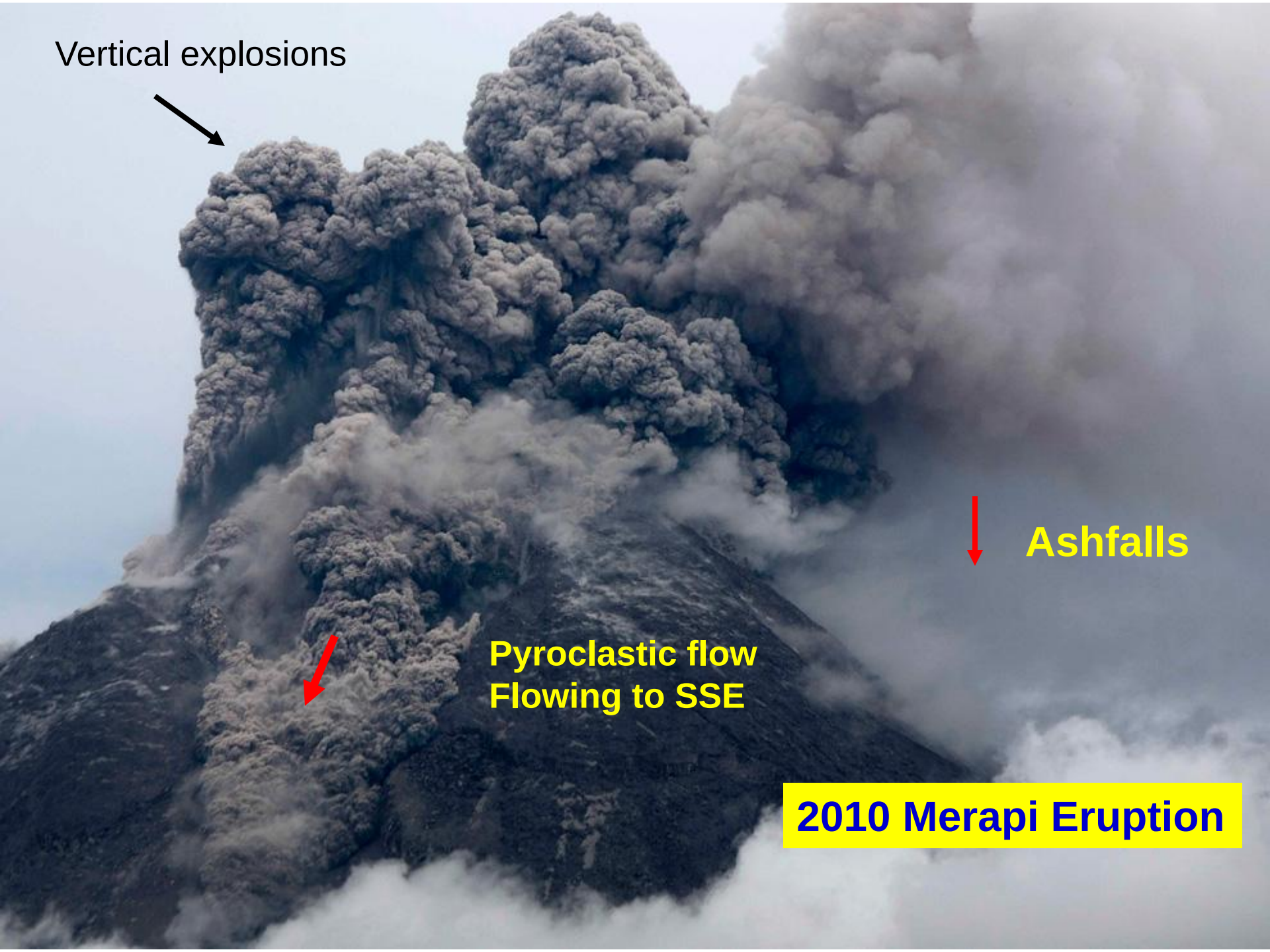
Panorama of Merapi Volcano from the north

STRATIGRAPHY & VOLCANIC HISTORY

Method	Age
Historical records (Kusumadinata, 1979)	1548 AD
^{14}C dating (Newhall et al., 2000)	9630 ± 60 yrs BP
Geologic interpretation	- 8000 – 60.000 yrs, (G. Turgo – G. Plawangan) - > 400.000 yrs, Pre Merapi (G. Bibi) - 3,44 Ma (G. Gendol Muntilan)

ROCK COMPOSITION

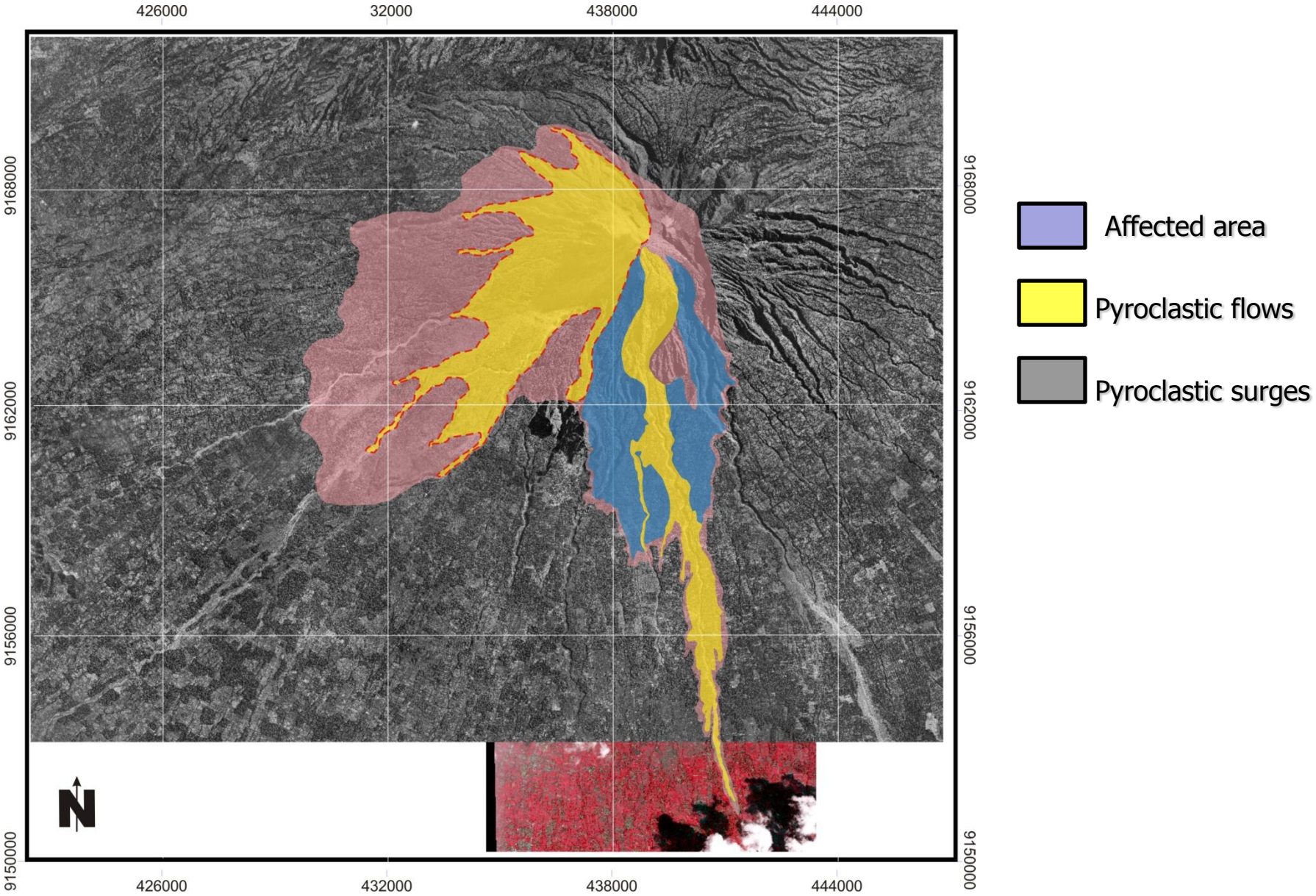
- Comprising lava flows & domes (igneous extrusive rocks), volcanic breccias (pyroclastic & lahars) & tuffs (typical strato/ composite volcano)
- In average having basaltic andesite in composition (52–58 wt.% SiO_2)
- Volcano Explosivity Index (VEI): 0-4
- Construction phase


Vertical explosions
Ashfalls
Pyroclastic flow
Flowing to SSE
2010 Merapi Eruption

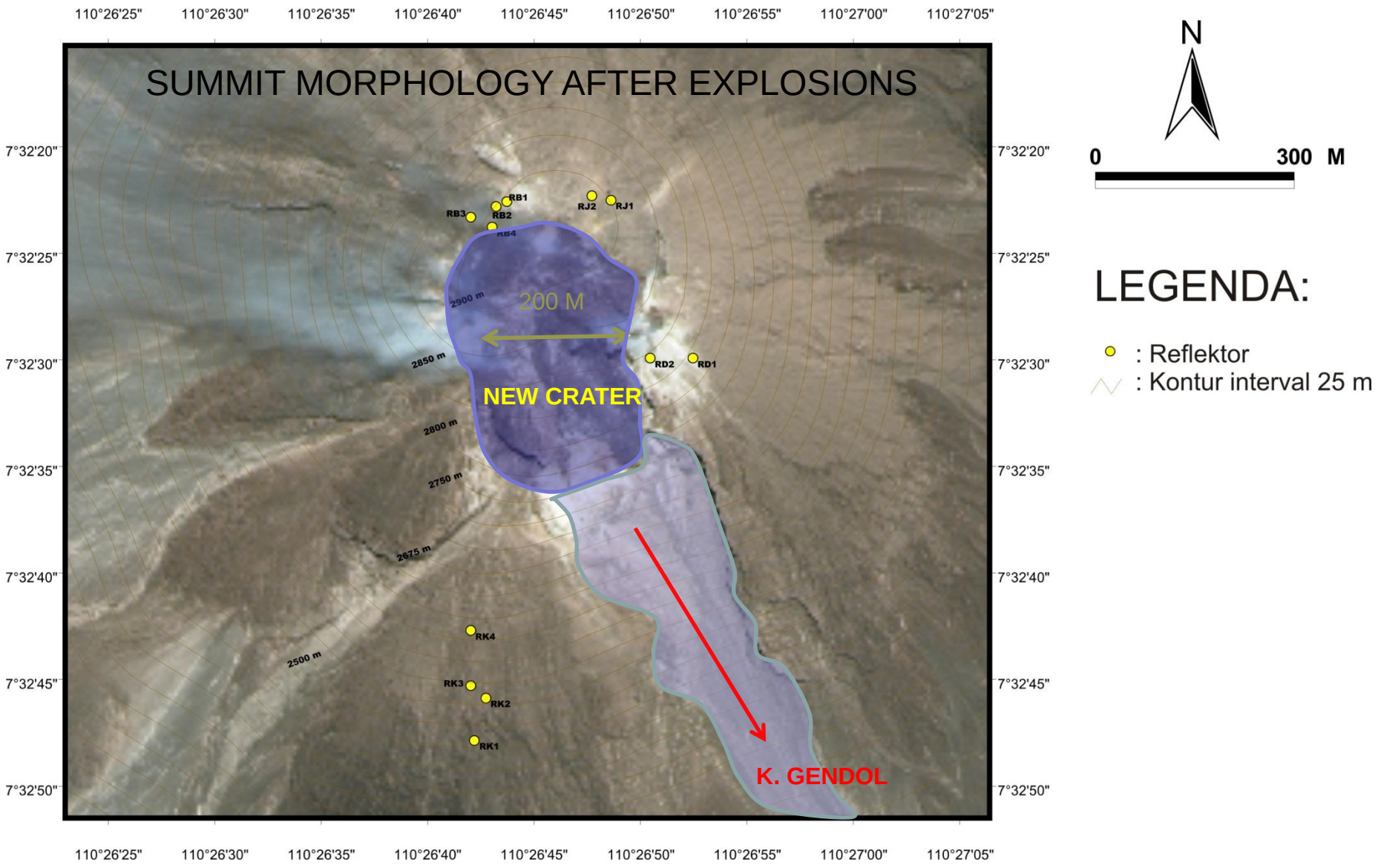
SLIDE 1: CHRONOLOGY OF THE 2010 MERAPI ERUPTION

- On September 10, 2010, the status of Merapi alert level was increased from first alert level (**NORMAL**) into second alert level (**WASPADA),** and on October 21, 2010, the status of Merapi alert level was increased from the second alert level (**WASPADA)** into third alert level **(SIAGA)**
- On October 25, 2010 at 06:00 LT, the status of Merapi alert level was increased from the third alert level into fourth alert level (**AWAS ,** the highest alert level). The save area for local people is at out side of 10 km radius from the summit
- On October 26, 2010, at 17:02 LT the first eruption occurred producing a pyroclastic flow that flowed down away from the summit as far as 7.5 km.
- On November 3, 2010 the Merapi activity increased again. It was shown by continuous formation of pyroclastic flows from 11:11 LT to 15:00 LT. The maximum distance of pyrclastic flows up to 9 km away from the summit.
- On November 3, 2010, at 15.05 LT it was decided that the safety area is at outside of 15 km from the Merapi summit .
- On November 4, 2010 at 00:00 LT, the explosion that had occurred since November 3, 2010 erupted pyroclastic flows that distributed in all upstream rivers around Merapi with the maximum flow distance was 14 km away from the summit.
- On November 5, 2010 at 01:00 LT the safe area was decided at outside of 20 km radius from the summit. The explosions were heard as far as 28 km from the Merapi summit. The height of eruptin column was up to 5 km.
- After that the Merapi activity declined, on December 3, 2010 the alert level was decreased to third alert level, December 30, 2010 step down into second alert level, and since September 15, 2011 it has returned into NORMAl (first alert level).
- Rain generated lahars (debris flows or mudflows) destroyed villages and some public facilities along rivers around Merapi during the 2010 rainy season.
- This coming rainy season, starting early of November 2011 lahar hazards may still threaten.

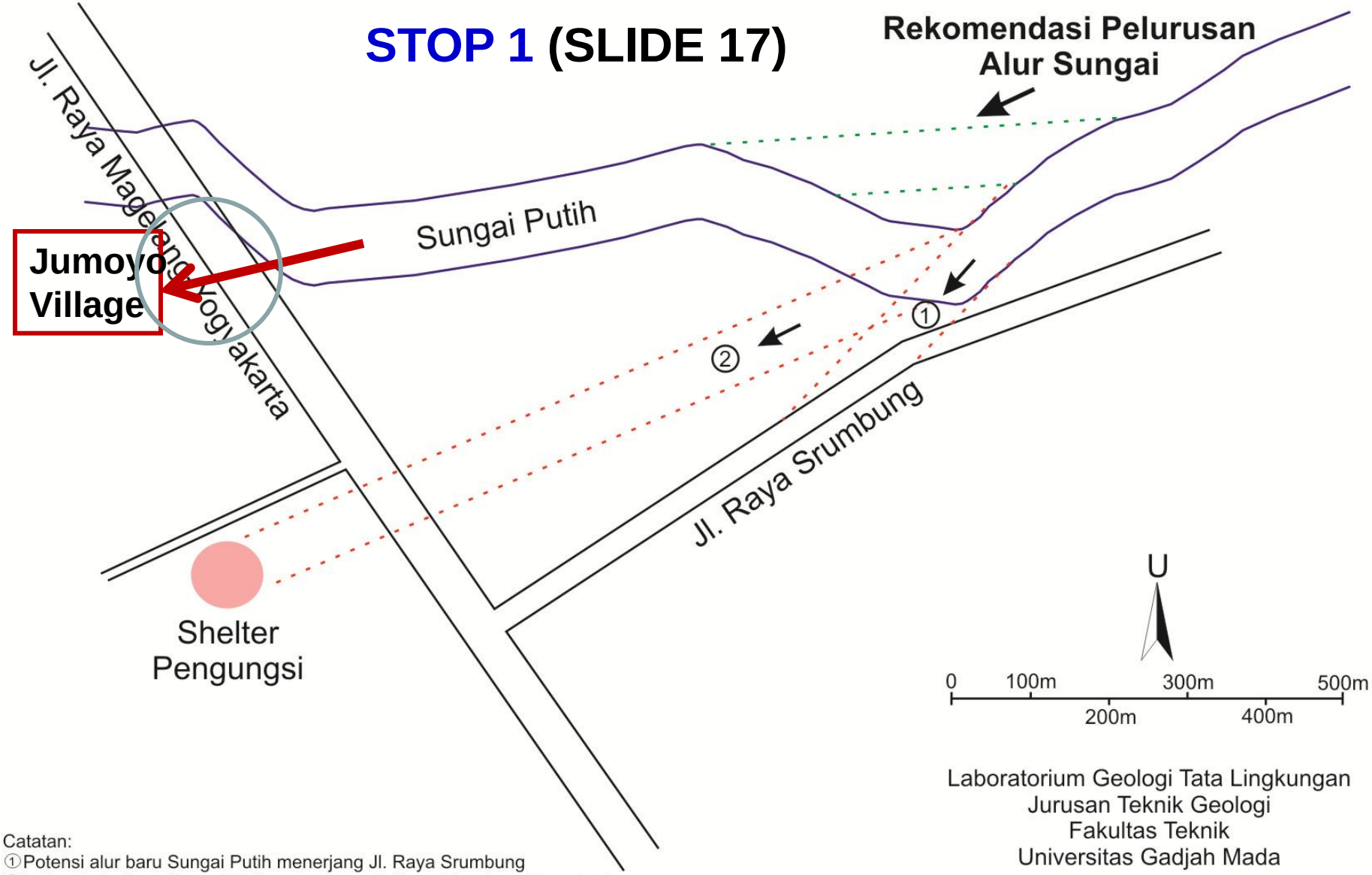
SLIDE 3: DISTRIBUTION OF 2010 MERAPI ERUPTION MATERIAL



SLIDE 2: ESTIMATION OF A NEW CRATER FORMED BY THE OCT 26, 2010 EXPLOSION



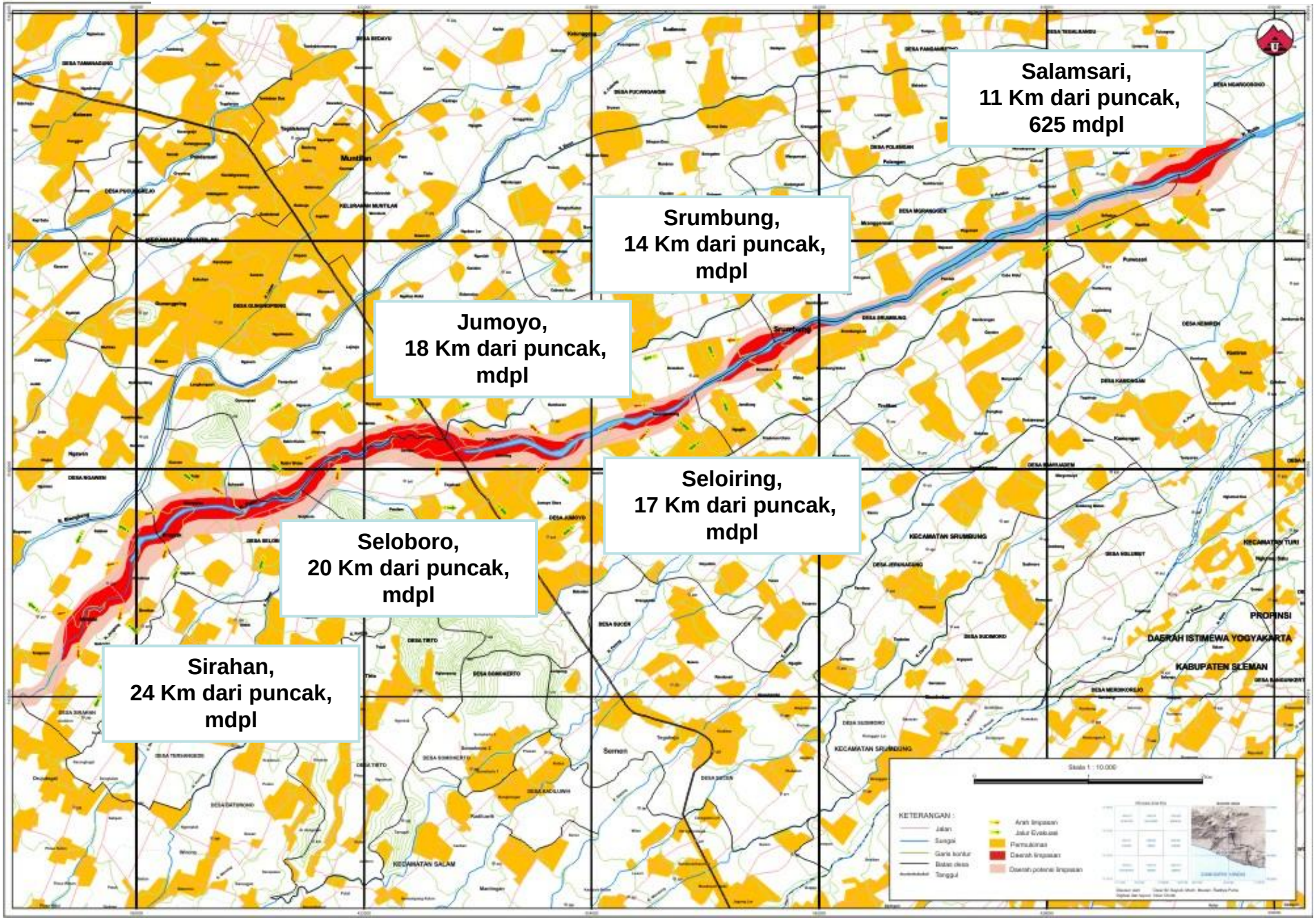
STOP 1 (SLIDE 17)



Catatan:
① Potensi alur baru Sungai Putih menerjang Jl. Raya Srumbung
② Potensi alur baru Sungai Putih menerjang Jl. Raya Magelang-Yogyakarta dan shelter pengungsi

Laboratorium Geologi Tata Lingkungan
Jurusan Teknik Geologi
Fakultas Teknik
Universitas Gadjah Mada

SLIDE 15: Lahar hazard map. Red color shows distribution of overflow lahars





Broken dam due to flowing lahar at Putih River in Sirahan Village (left), Krapyak Village (middle), and Ngepos Village (right).

SLIDE 12



Broken dike caused by lahars in Putih River at Krapyak Village (left & middle), and Karanggowang Village (right).

SLIDE 10

A broken sabo dam destroyed by lahars at Putih River, Salamsari, Mranggen Village

SLIDE 11

Lahar channels and broken sabo dam in the upstream of Putih River, NE Salamsari, Ngepos Village, Kecamatan Srumbung as the highest location point for lahar observation.

Broken sabo dam due to lahar flow at Putih River (left), and a new channel from Putih River entering into Batang River (right).

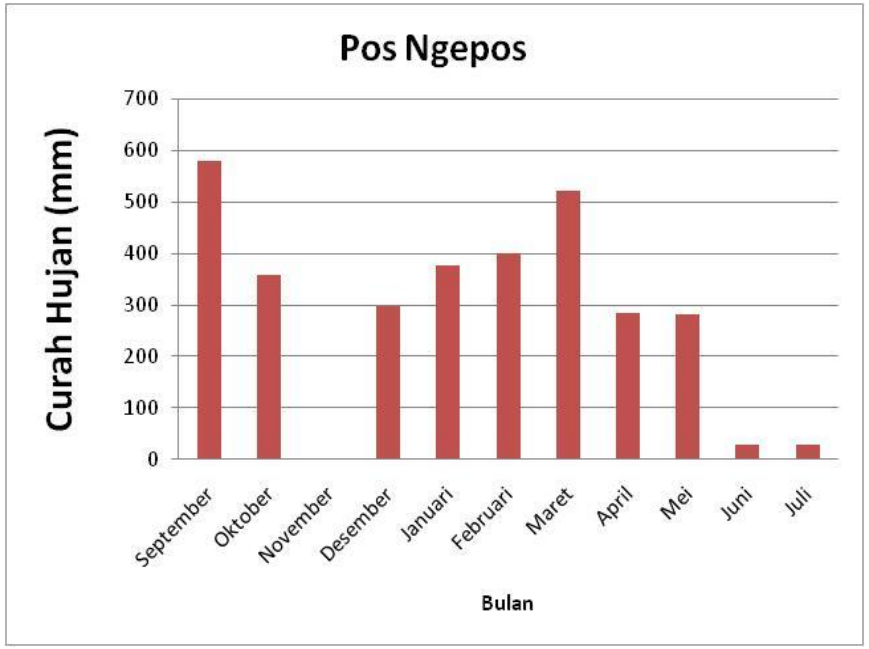
SLIDE 13

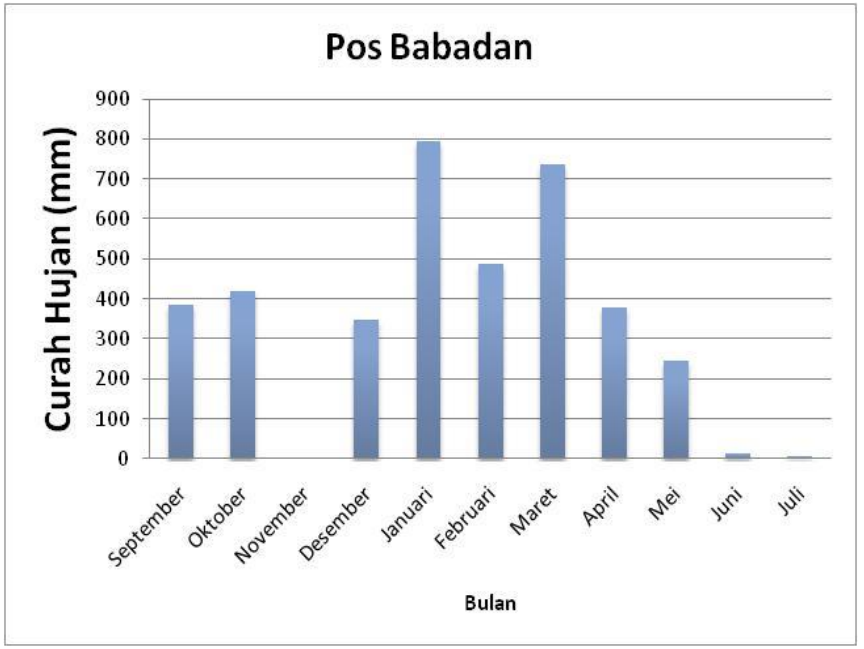
Mass movement or rock collapsed at Putih riverbank due to erosion of flowing lahars in the junction of Putih – Blongkeng Rivers (left) and at Krapyak Village (right).

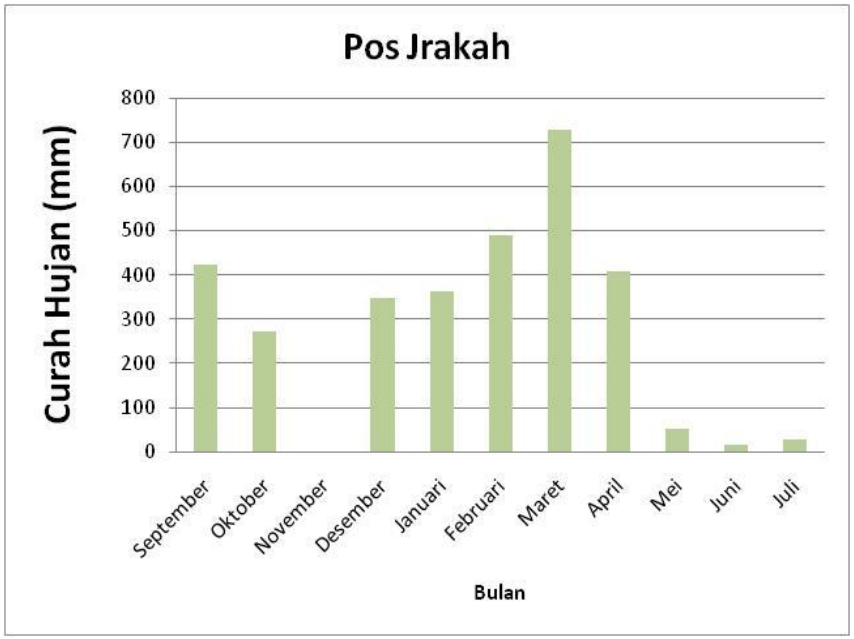
PARAMETERS FOR RAIN GENERATED LAHARS

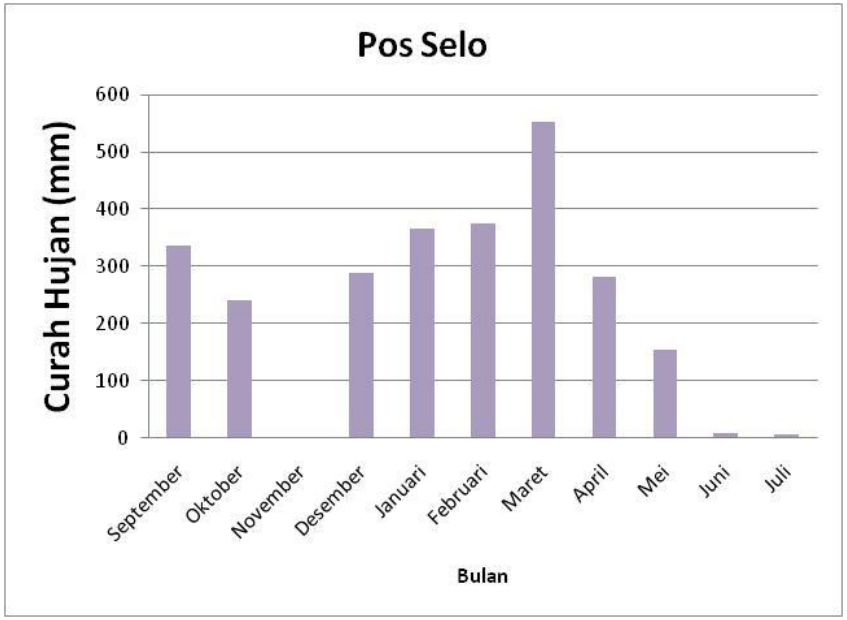
- Pyroclastic deposits (new eruptive products, loose material)
- Volcanic/river slopes
- Rainfalls

SLIDE 7: Rainfalls in every volcano observatory around Merapi Volcano

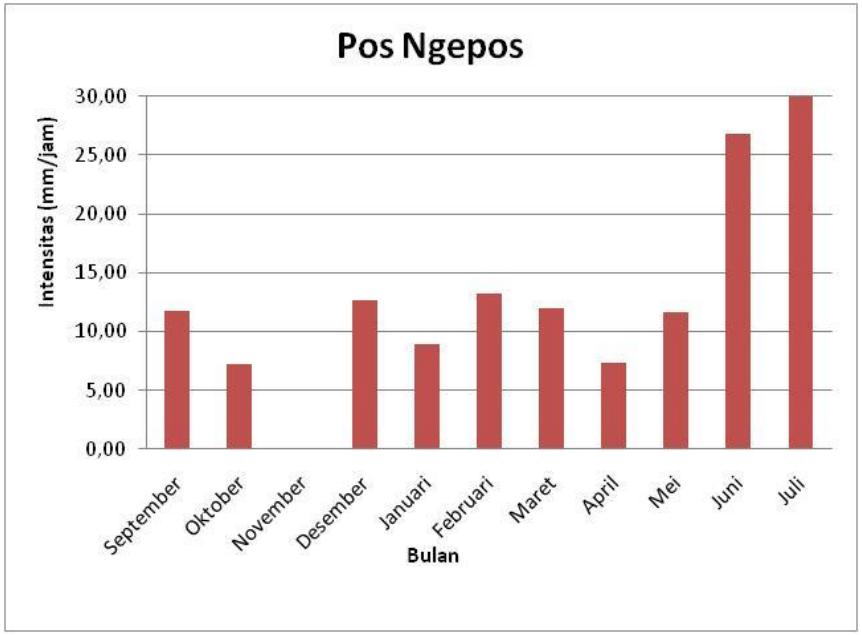


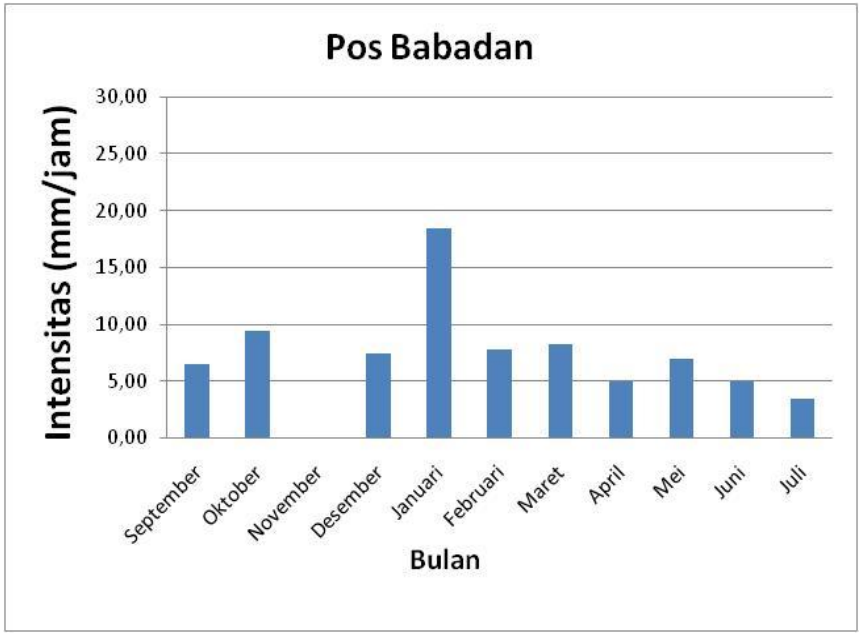






SLIDE 8


Pos Ngepos
Intensitas (mm/jam)
30,00
25,00
20,00
15,00
10,00
5,00
0,00
September
Oktober
November
Desember
Januari
Februari
Maret
April
Mei
Juni
Juli
Bulan


Pos Babadan
Intensitas (mm/jam)
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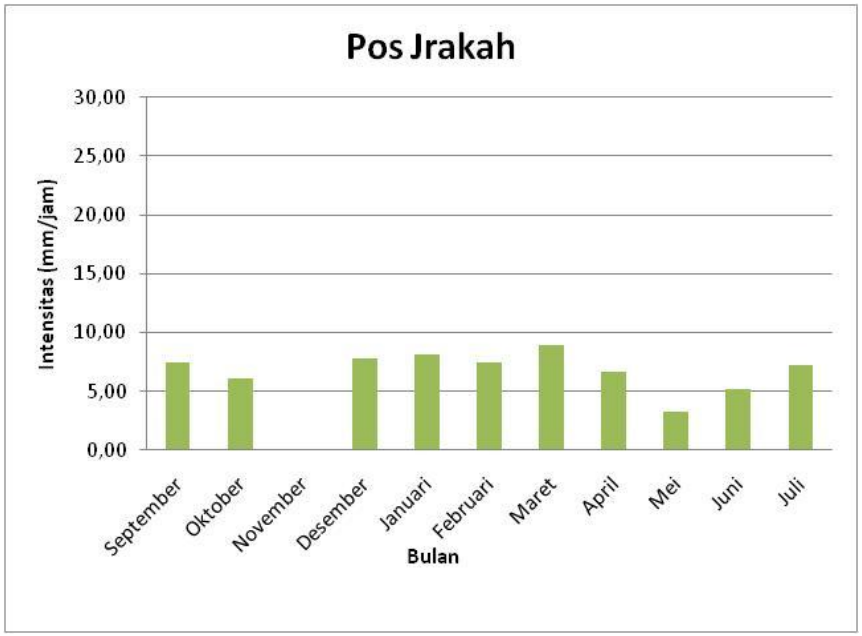
25,00
20,00
15,00
10,00
5,00
0,00
September
Oktober
November
Desember
Januari
Februari
Maret
April
Mei
Juni
Juli
Bulan


Pos Jrakah
Intensitas (mm/jam)
30,00
25,00
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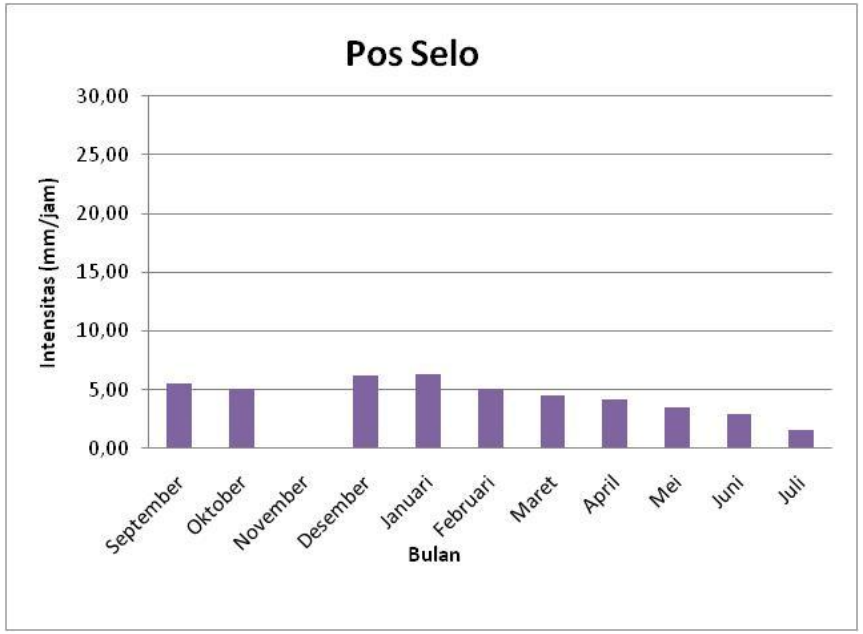
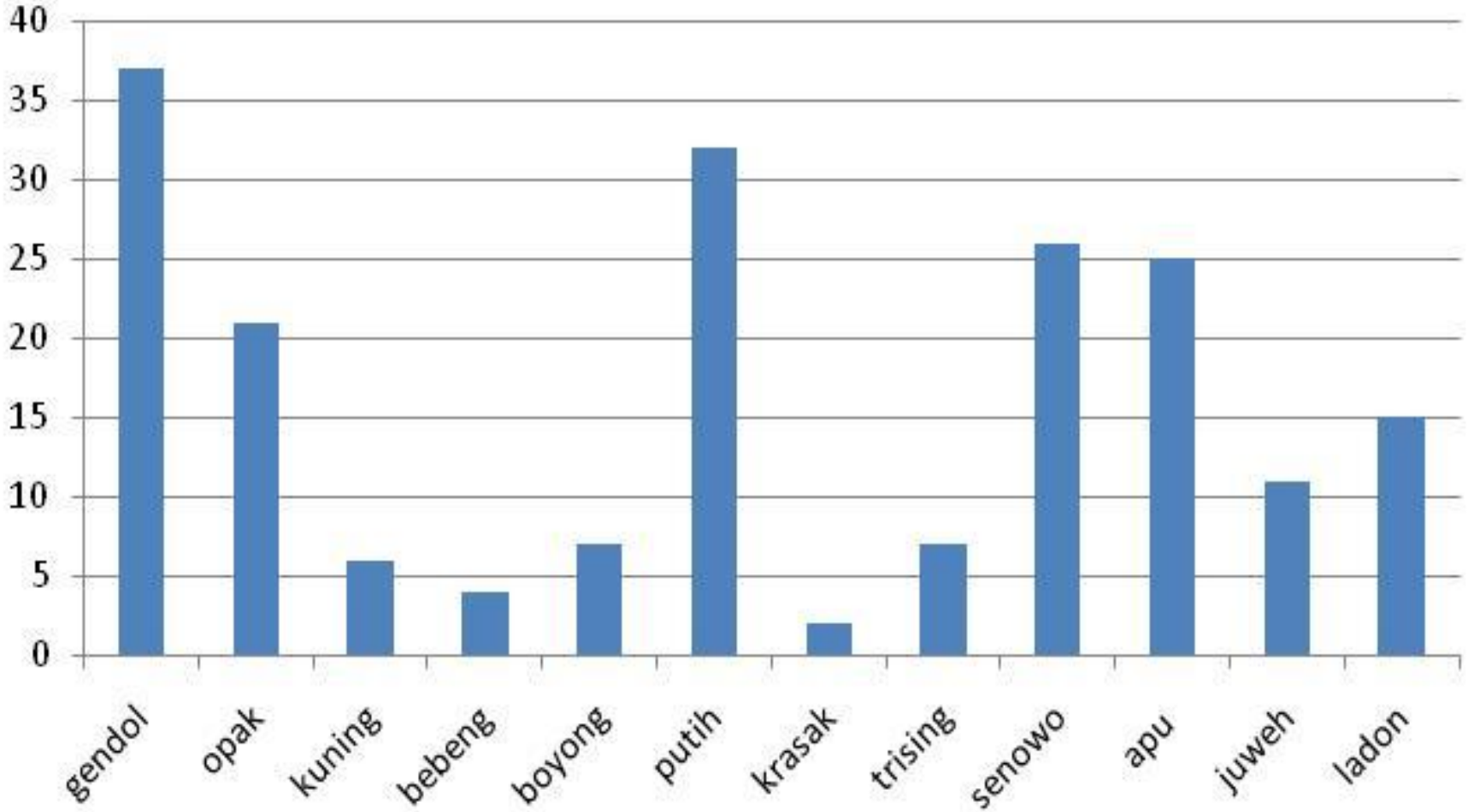
September
Oktober
November
Desember
Januari
Februari
Maret
April
Mei
Juni
Juli
Bulan

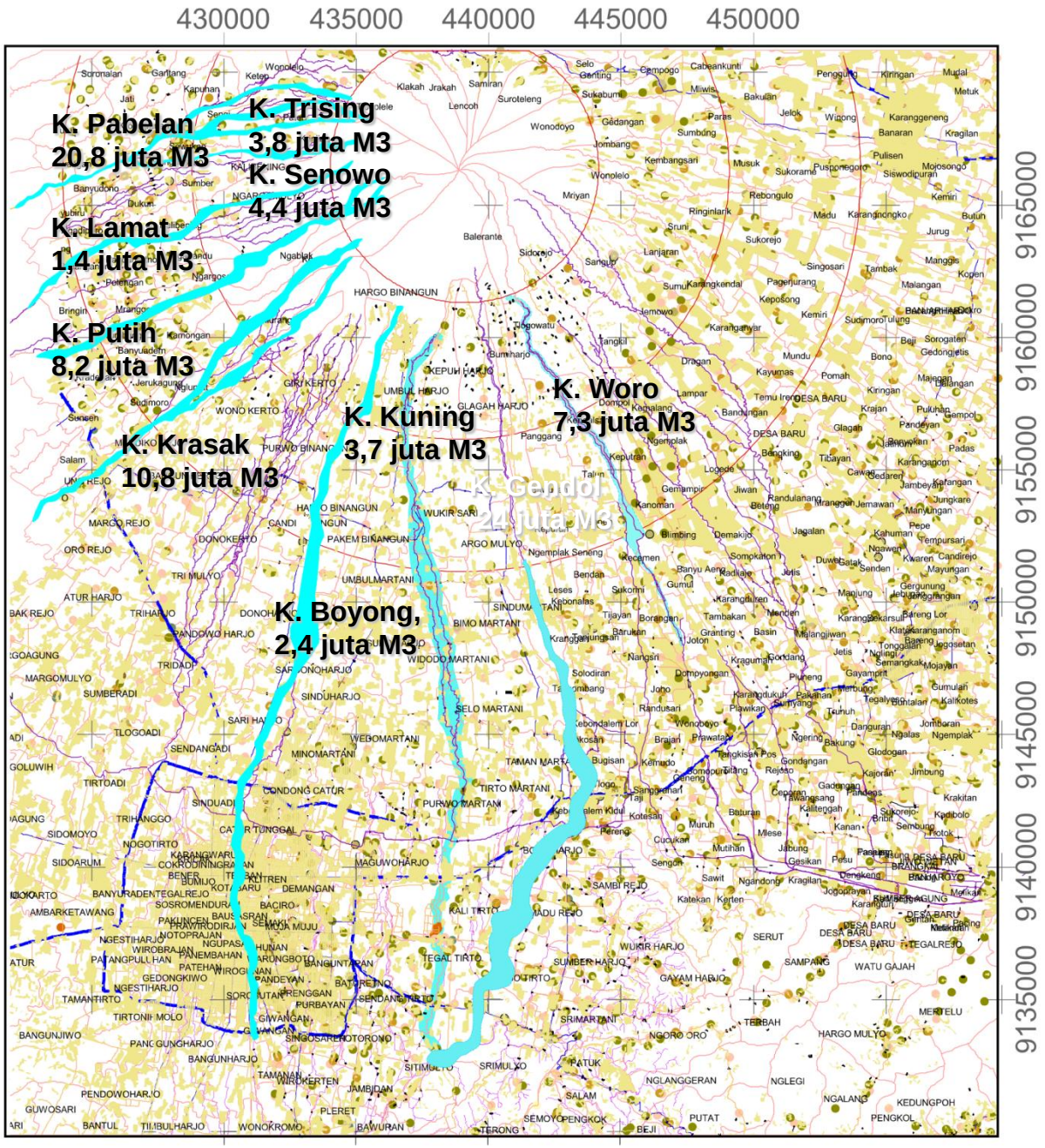

Pos Selo
Intensitas (mm/jam)
30,00
25,00
20,00
15,00
10,00
5,00
0,00
September
Oktober
November
Desember
Januari
Februari
Maret
April
Mei
Juni
Juli
Bulan

SLIDE 9: Merapi lahar occurrences in each rivers from January 2010 – July 2011



SLIDE 16: Villages destroyed by lahars along Putih River

4	K. Putih	Cabe Lor	Srumbung	
		Srumbung	Srumbung	
		Seloiring	Jumoyo	
		Gempol		
		kadilogo		
		Seloboro	Seloboro	
		Krapak		
		Klumpukan		
		Sukowati		
		Semua dusun	Sirahan	



PETA POTENSI LAHAR

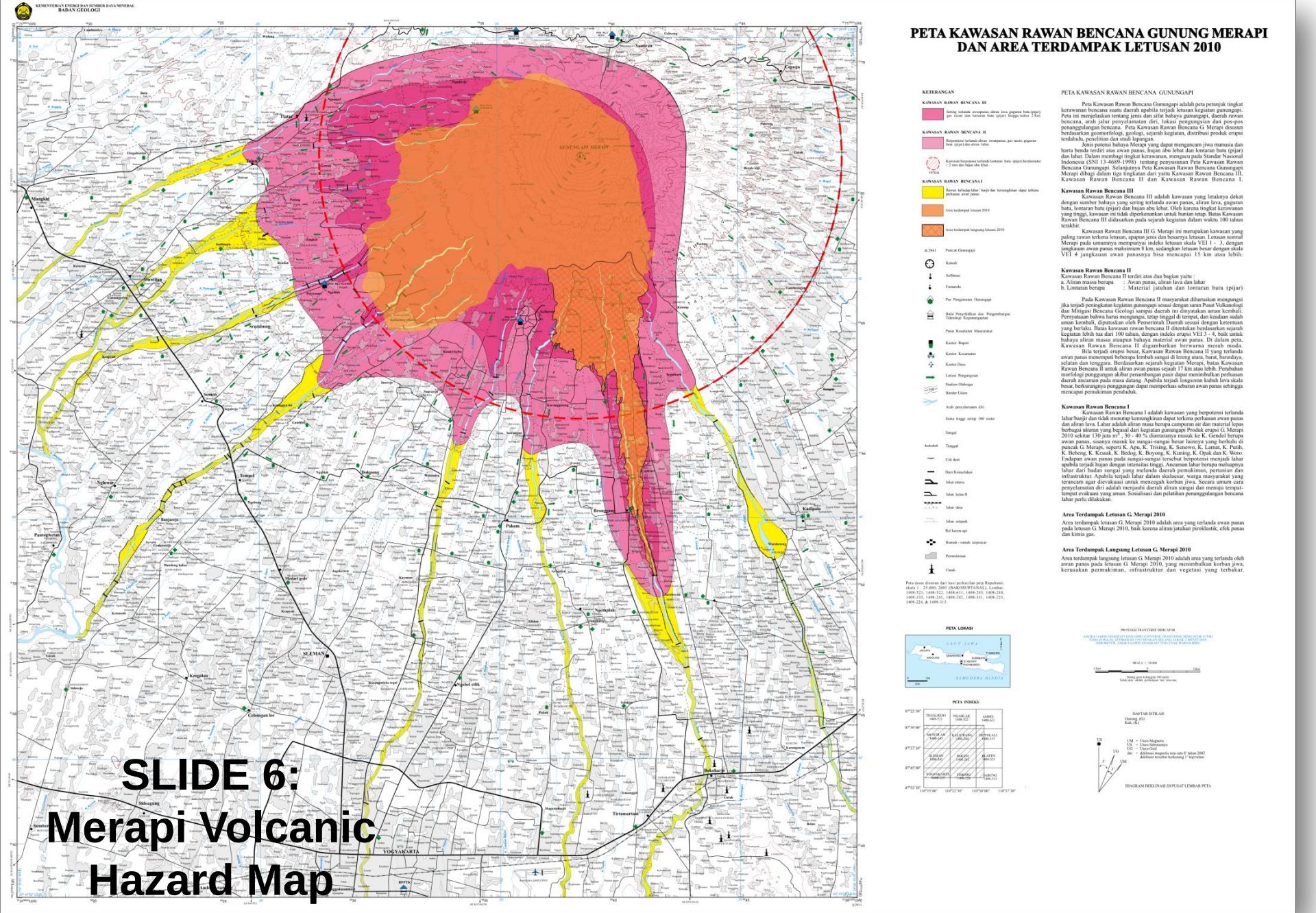
N
W E

0 5 km

LEGENDA:

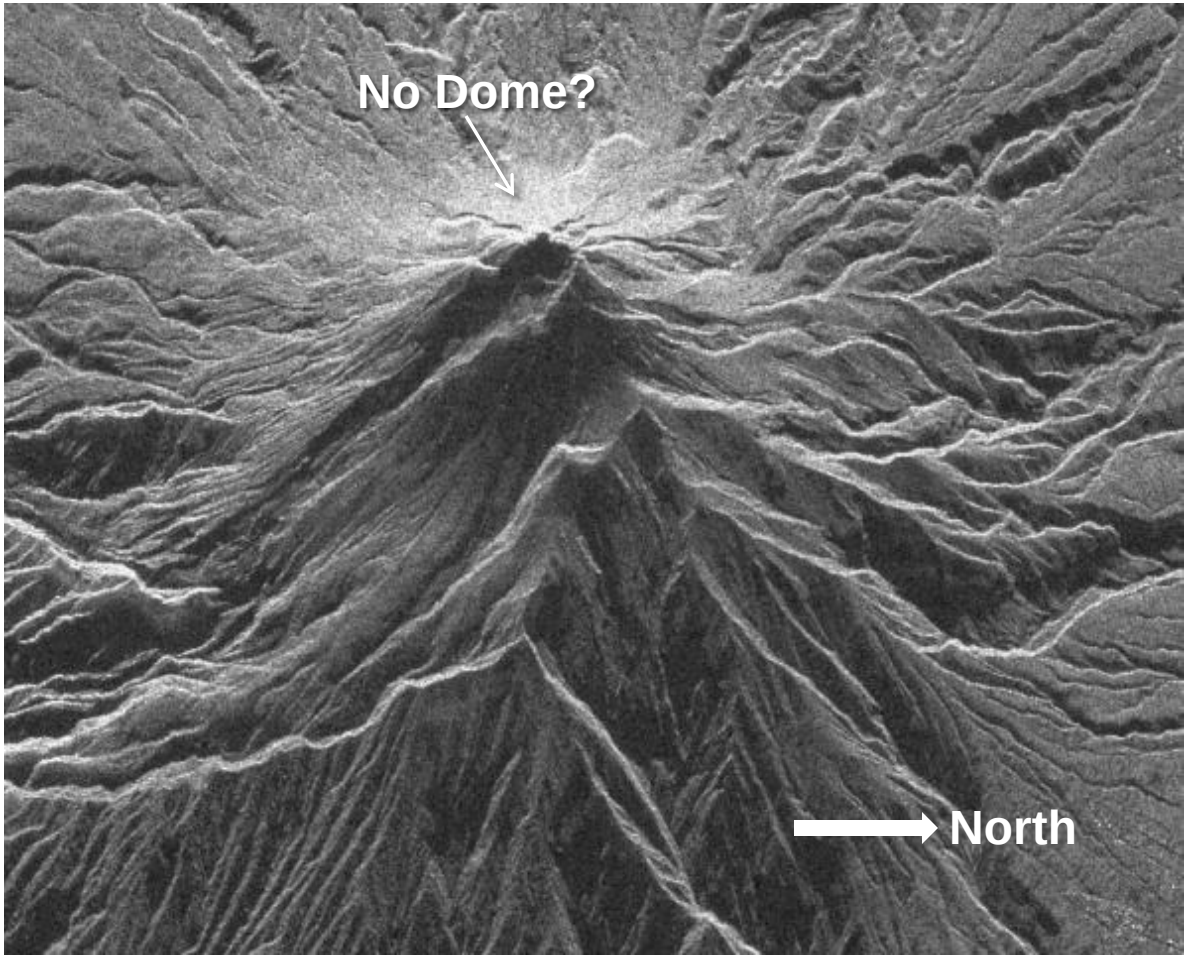
- : Endapan Aliran Awanpanas
- : Endapan Lontaran Awanpanas
- : Batas Buffer Aliran dan Lontaran Awanpanas
- : Daerah berpotensi terlewati lahar dingin
- : Batas radius dari puncak G. Mera
- : Sungai
- : Pemukiman
- : Jalan Nasional
- : Jembatan Layang
- : Jalan Lokal
- : Jalan Propinsi
- : Kantor Bupati
- : Kantor Camat
- : Kantor Desa
- : Layanan Pos
- : Pasar
- : Rumah sakit
- : Sekolah

SLIDE 14:
Potential Lahar Map

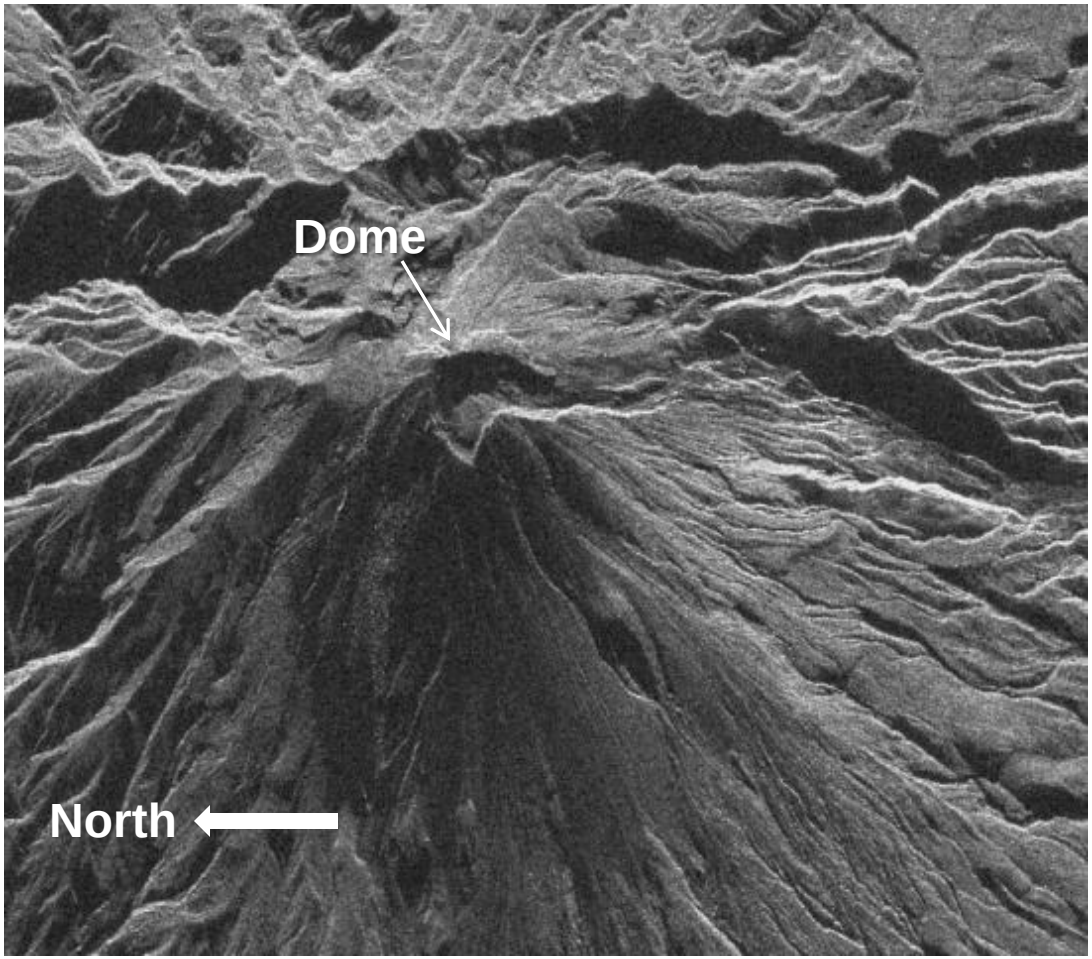


SLIDE 6: Merapi Volcanic Hazard Map

SLIDE 4: RadarSat2: Merapi 6 November 2010 at 1100 UTC



SLIDE 5: RadarSat2: Merapi 6 November 2010 at 2200 UTC



MANY MORE PHOTOS 7 BLOCK DIAGRAMS IN STOP 3: MERAPI MUSEUM THANKS & SEE YOU TOMORROW