

G1 – 2

Hydrological monitoring in the south-western and southern flank of Mt. Merapi

- | | |
|-----------------|------------------|
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Contents

- Objective of hydrological monitoring
- Progress situation for installation of equipment
- Next action

Objective of Hydrological monitoring (G1-2)

To provide hydrological information, which is necessary for the module of **Multimodal Sediment Disaster Simulator System** to mitigate **Lahar hazards** after the volcanic eruption.

Lahar hazard mitigation

- When will lahar occur?
 - Risk judgment system with two rainfall indices
- Where will lahar inundate?

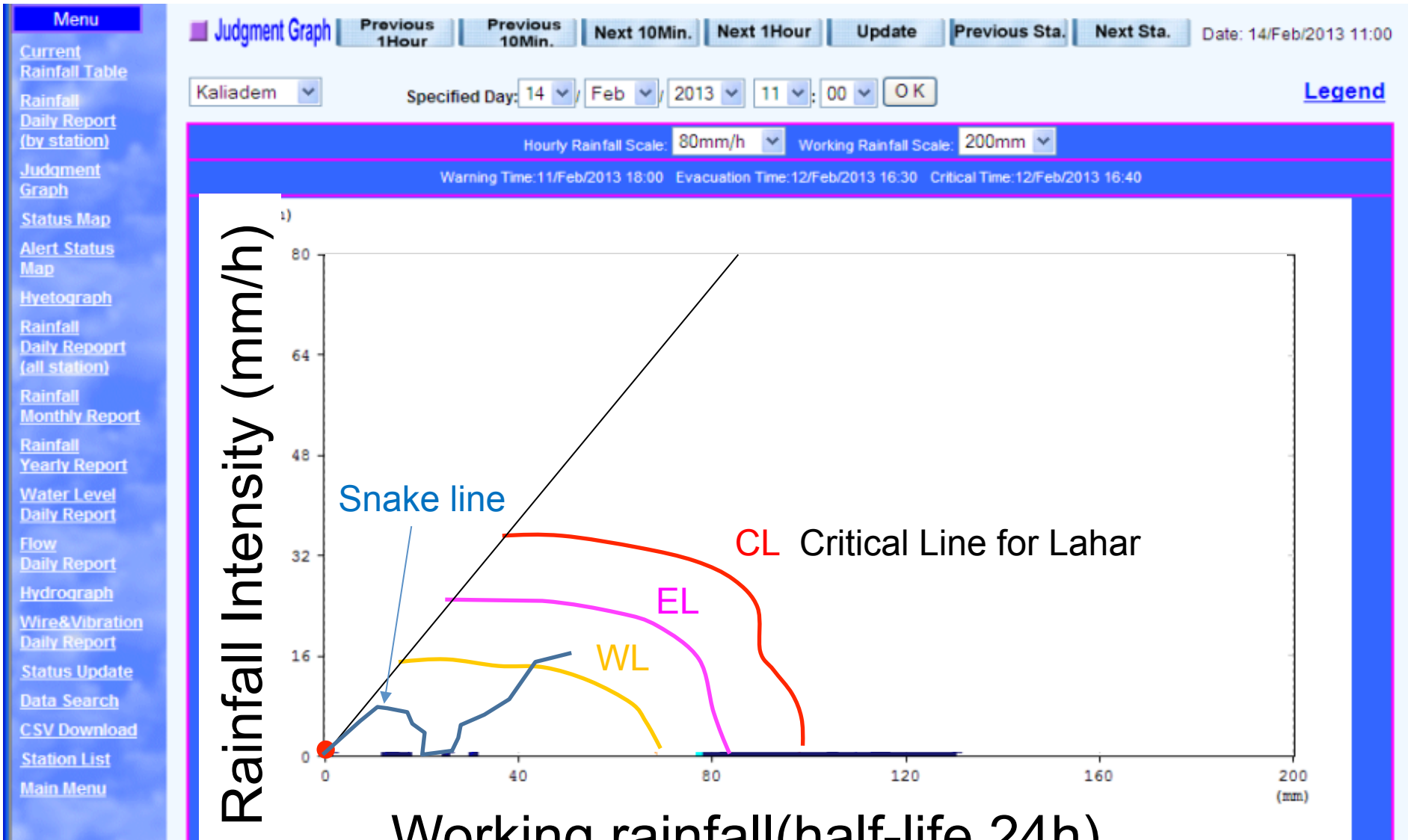


Fig.1 Risk judgment system operated by Balai

To improve reliability of this system, CL line should be updated on a regularly.

To update CL line, non-occurrence rainfall data is necessary.

→not only rainfall data also water level data at each river basin have to be collect.

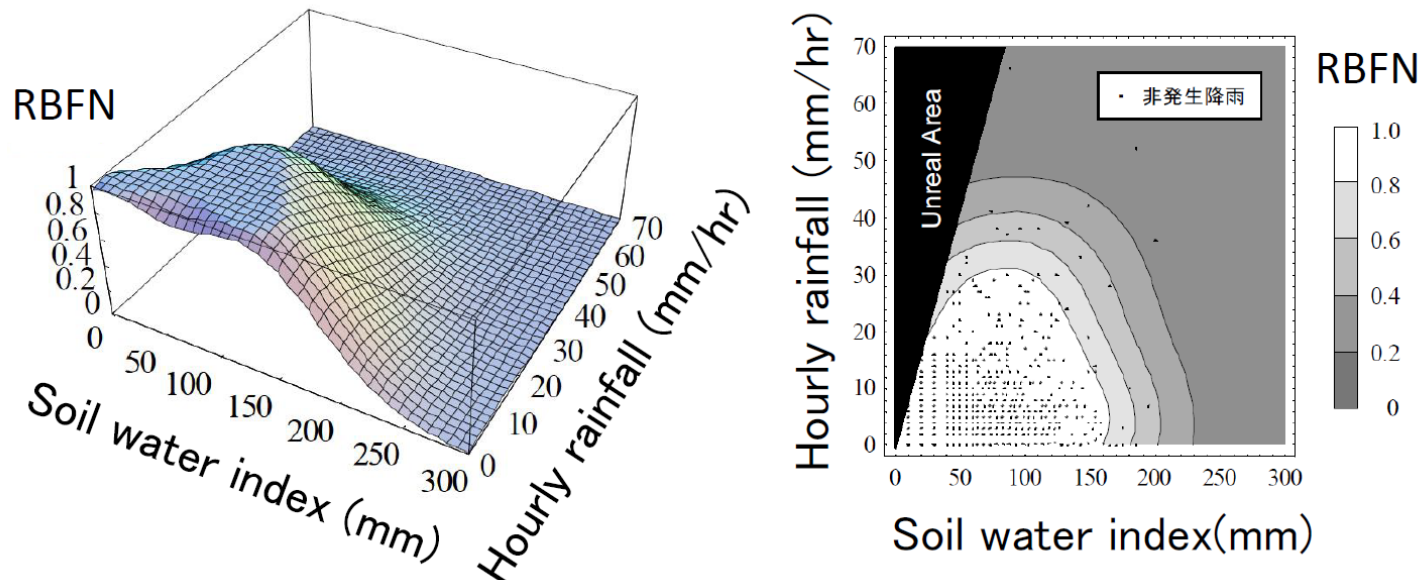


Fig.2 Radial Basis Function Network for probability of non-occurrence rainfall

Lahar hazard mitigation

- When will lahar occur?
 - Risk judgment system with two rainfall indices → real-time rainfall data, non-occurrence rainfall data
- Where will lahar inundate?
 - Lahar inundation simulation

Lahar simulation to estimate hazardous area

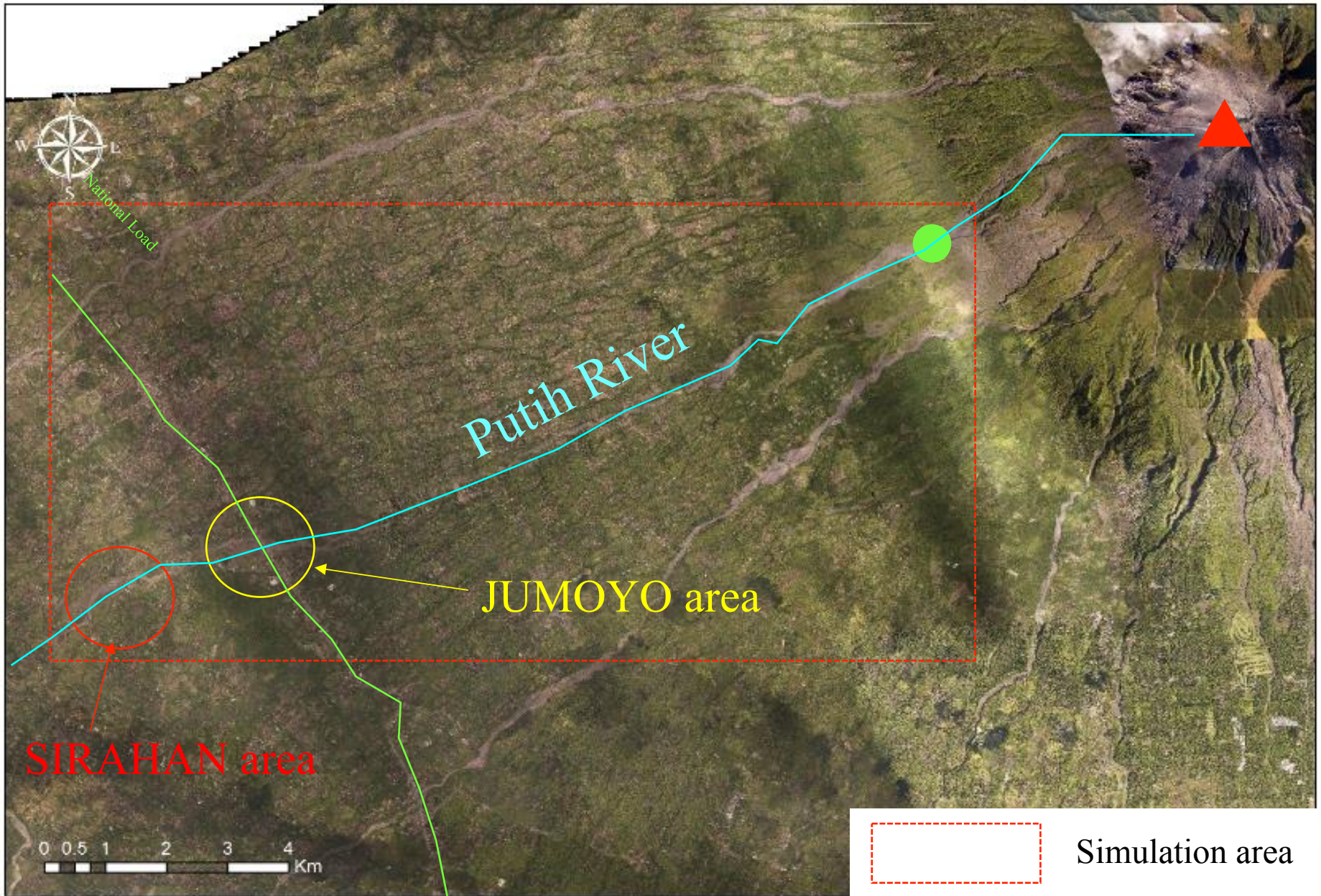


Fig. 3 Lahar simulation in the Putih River basin.

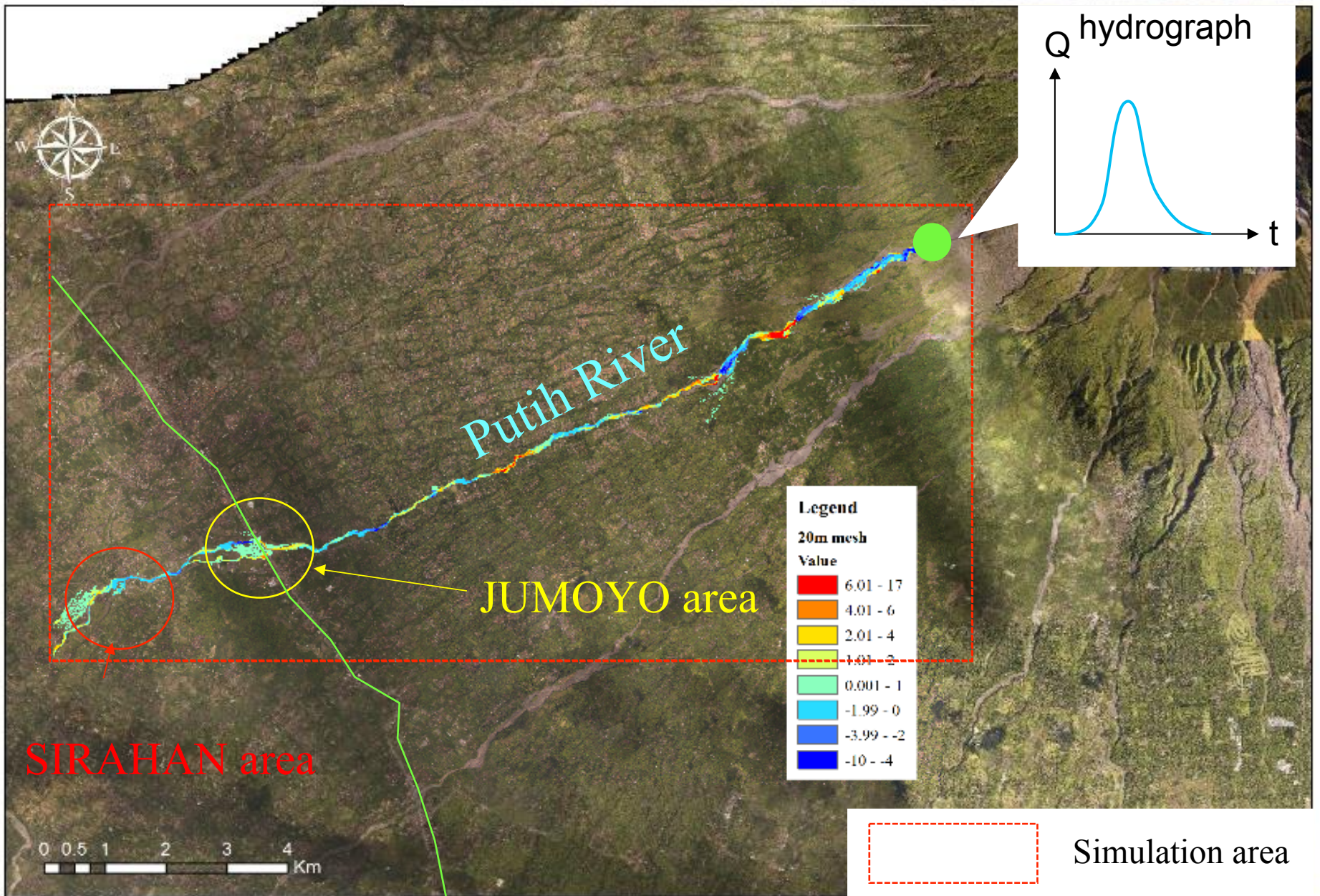


Fig. 3 Lahar simulation in the Putih River basin.

Direct run-off ratio changes over time after the eruption

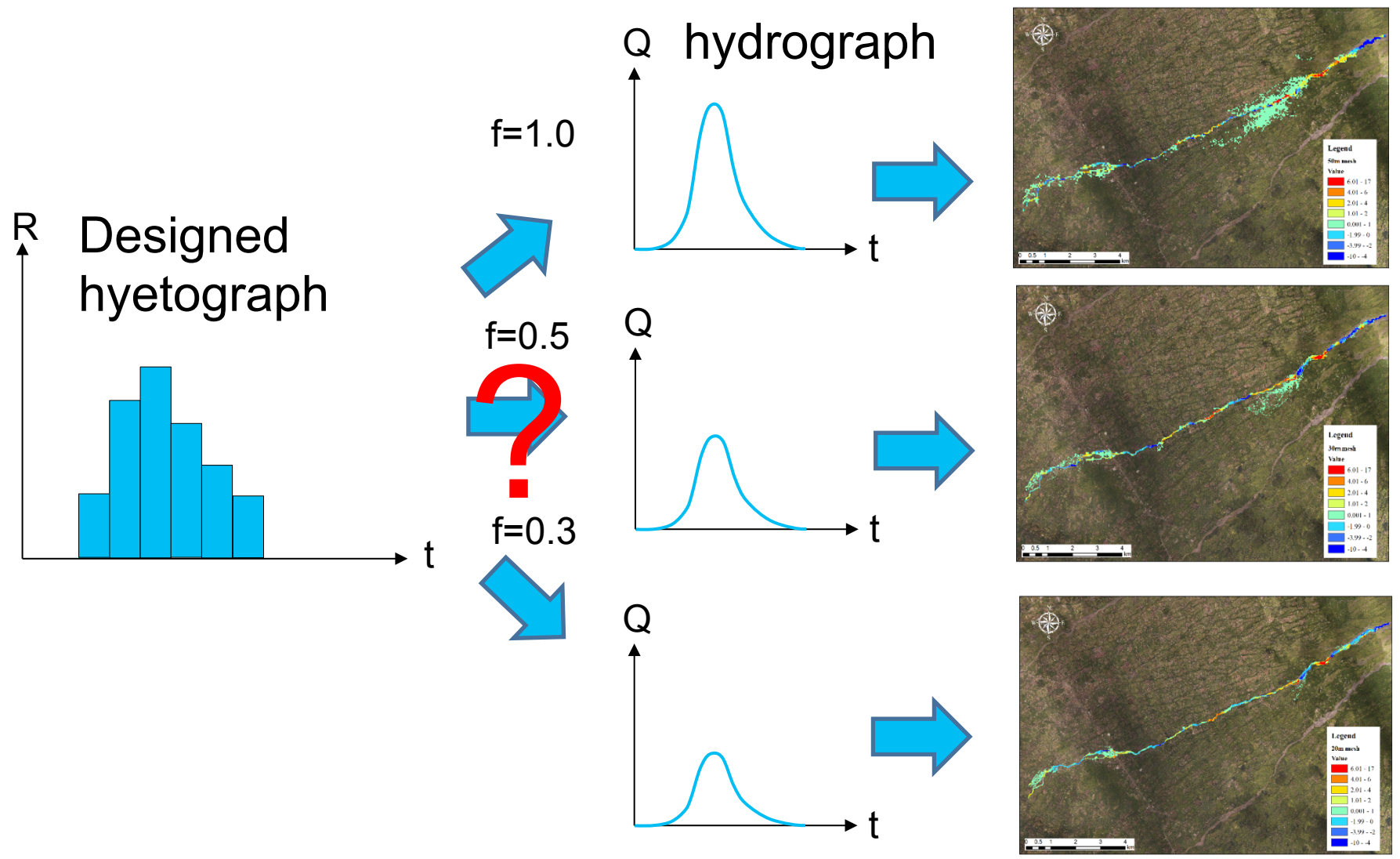


Fig.5 Hydrological monitoring will help us to determine current f value for the lahar hazard simulation.

Lahar hazard mitigation

- When will lahar occur?
 - Risk judgment system with two rainfall indices → **real-time rainfall data**
- Where will lahar inundate?
 - Lahar inundation simulation
 - **designed hydrograph**
temporal direct run-off ratio change

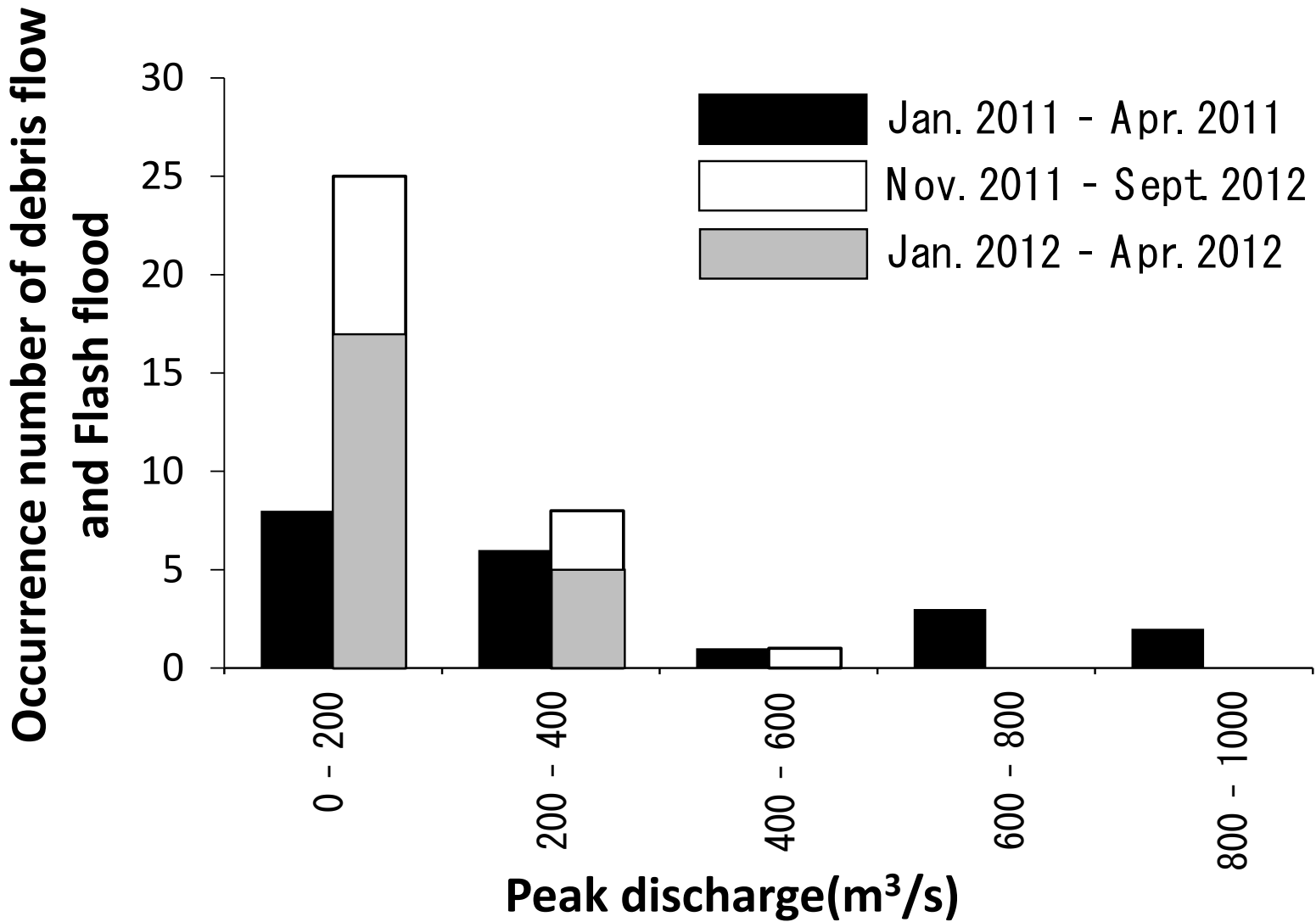


Fig.5 distribution of the peak discharge for debris flows and flash floods at PU-C11 during January 23, 2011 to September 12, 2012

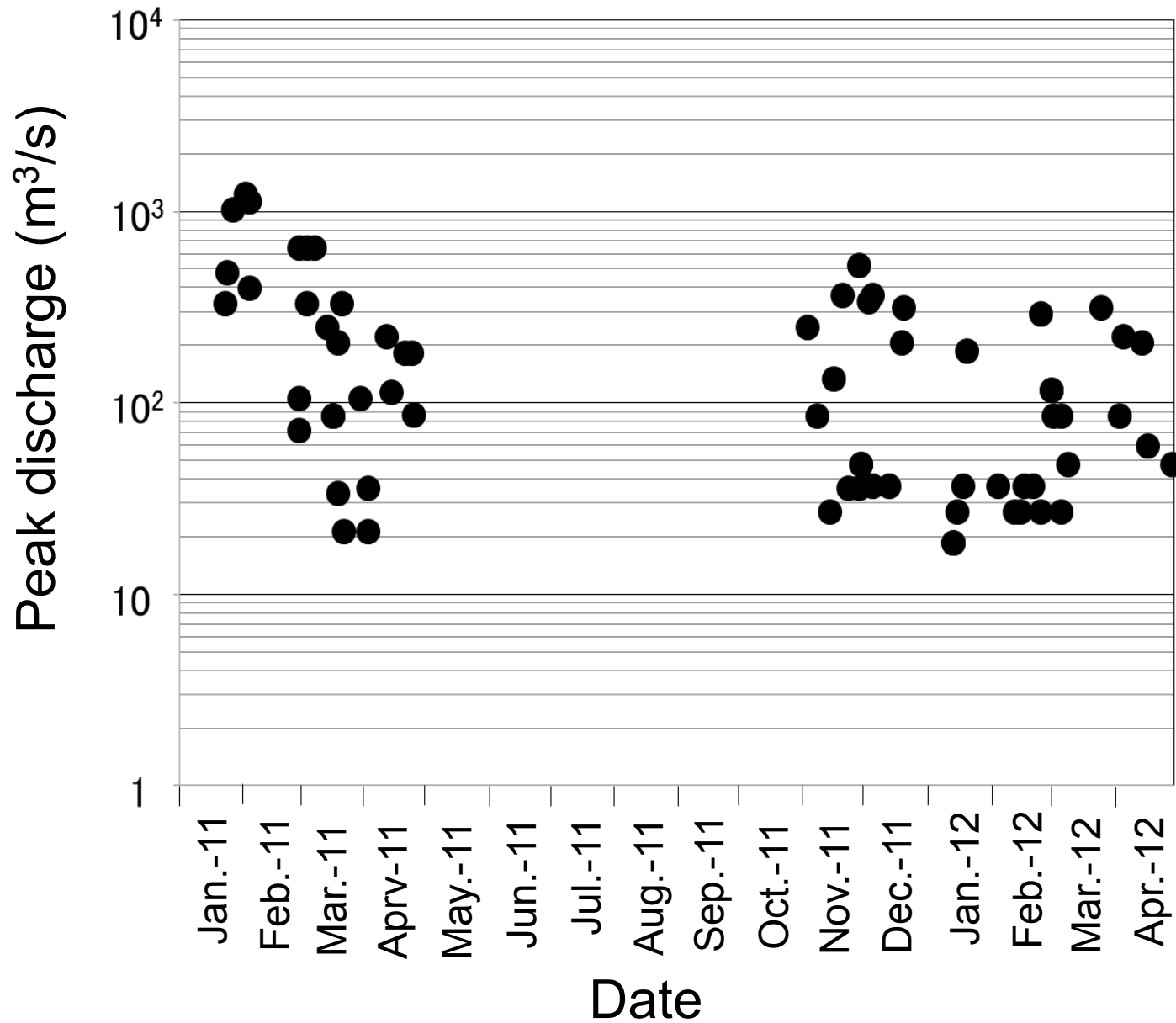
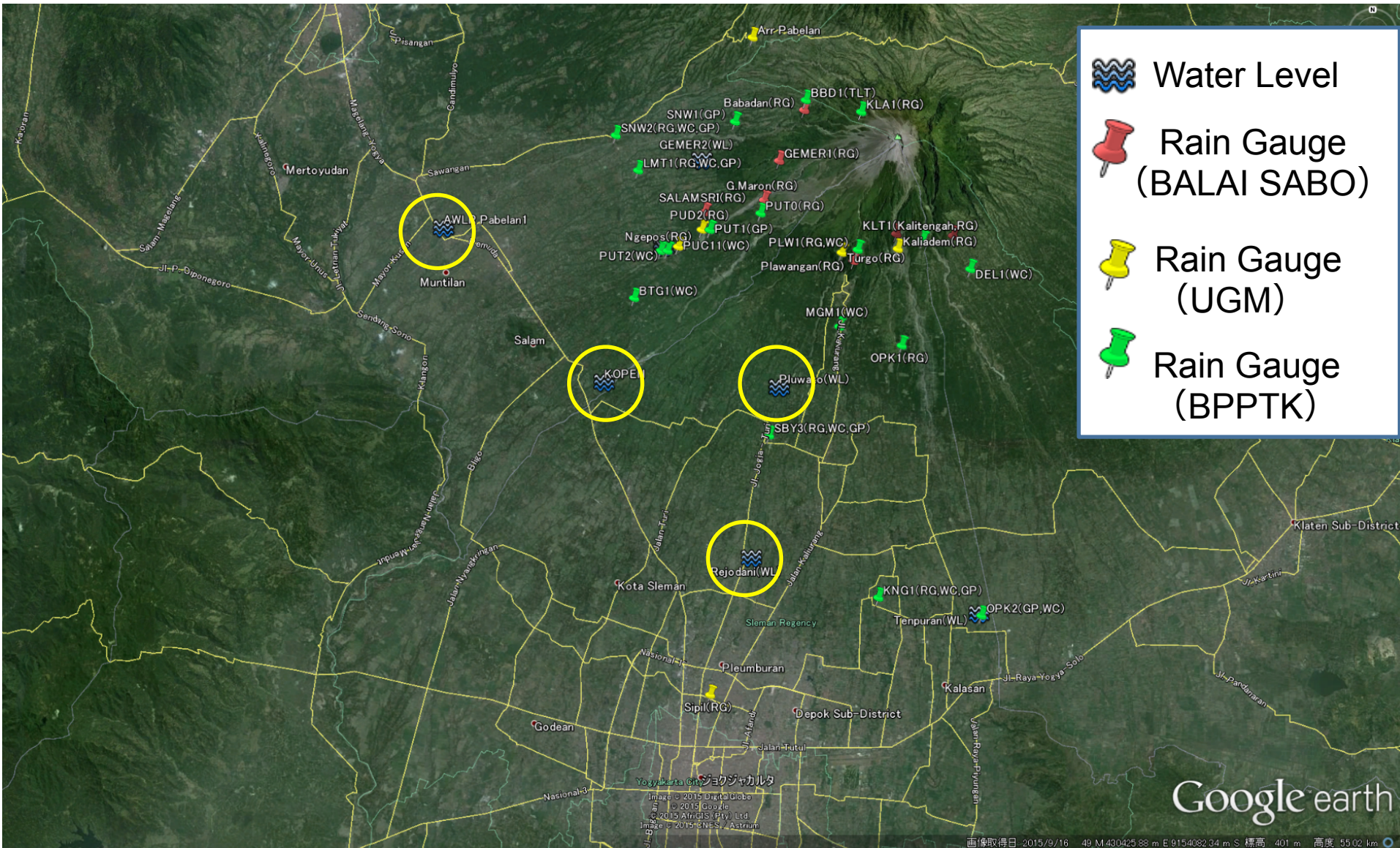


Fig. 6 Temporal changes in the peak discharge of debris flows and flash floods.

Progress situation for installation

Monitoring Network around Mt. Merapi

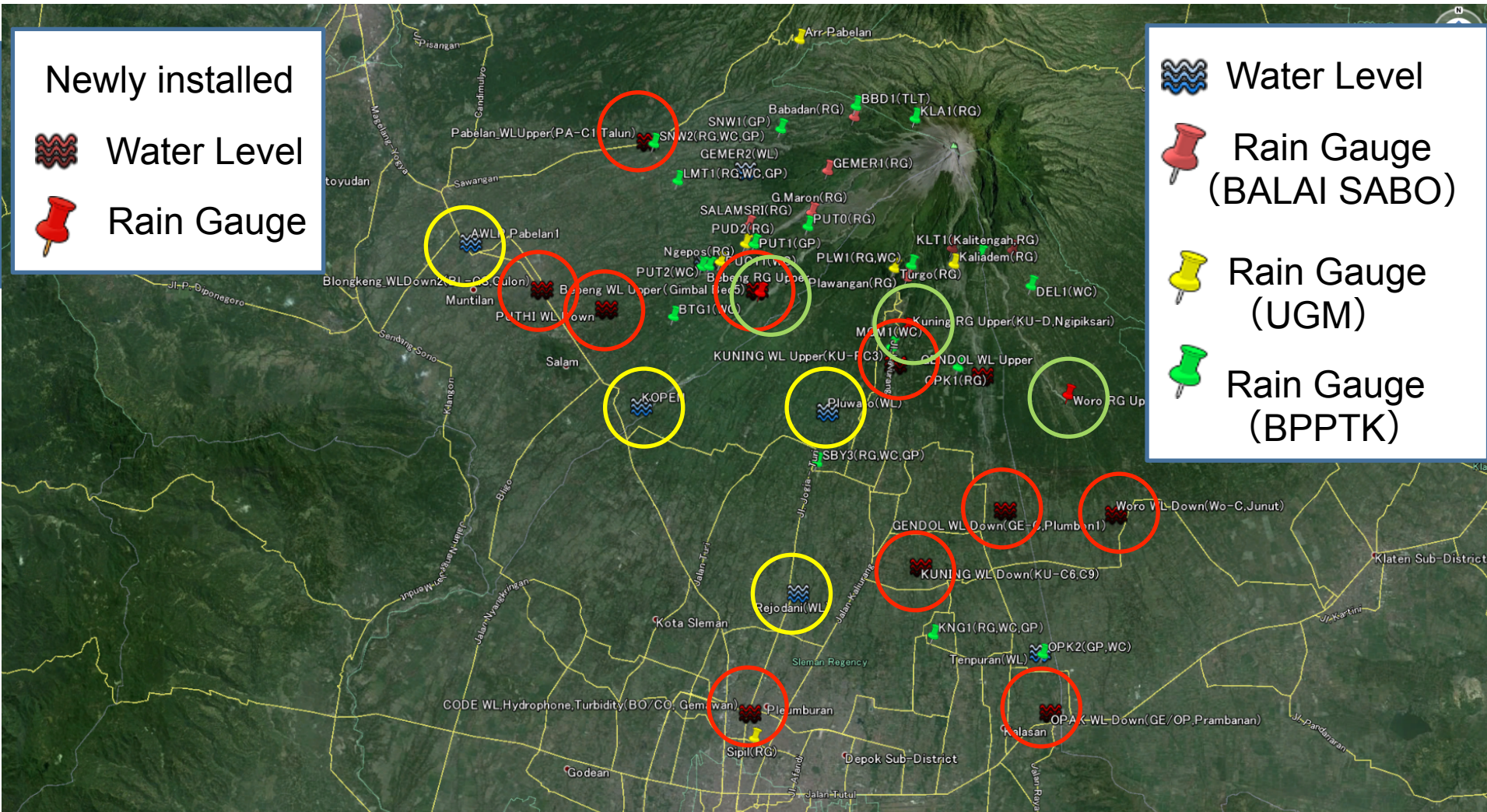


4 water level gauges were installed in the 3 river

Progress situation for installation

- Under SATREPS project, 4 rain gauge, 12 water level gauge and 10 IP Camera are planed to be installed to enhance existing monitoring network around Mt.Merapi.
- All new equipment were delivered to UGM until the end of Dec. 2014.

Monitoring Network around Mt. Merapi



- 3 Rain gauges, 10 Water Level gauges, 10 IP Cameras have been installed 8 rivers around Mt. Merapi (Woro, Gendol (Opak), Kuning, Boyong, Code, Putih, Paberan)

Progress situation for installation

- Under SATREPS project, 4 rain gauge, 12 water level gauge and 10 IP Camera are planed to be installed to enhance existing monitoring network around Mt.Merapi.
- All new equipment were delivered to UGM until the end of Dec. 2014.
- All Rain gauges, water level gauges, IP Cameras(except 2 Rain gauges and 1 IP Camera at K.Putih) have already installed until the end of May 2015.



Fig.6 Water level gauge& IP Camera

Existing and Newly installed monitoring equipment

Equipment		River											新規設置	
		Paberan (Apu)	Blongkeng	Putih	Krasak Bebeng	Boyong	Code	Kuning	Opak	Gendol	Woro	Spare	Number	
Rainfall gauge	Upstream E.L. 800m-	1 (BS)		2 (BS) 1 (BPPTK)	—	1 (BPPTK) 1 (UGM) 1 (BS)				1 (BS) 1 (UGM)	1 (BS) 1 (BNPB?)		0	4
	Middle Stream E.L.400-800m	1 (BPPTK)		1 (UGM) 1 (BS) 1 (BPPTK)	1 (SATREPS)	1 (BNPB)		1 (SATREPS)	1 (BNPB)		1 (SATREPS)		3	
	Downstream E.L.-400m					1 (BPPTK)	1 (UGM)					*Spare	1	
Water level	Upstream E.L. 800m-	—		1 (SATREPS) *no electricity									1	12
	Middle Stream E.L.400-800m	1 (SATREPS)		1 (UGM)	1 (SATREPS)	1 (BS)		1 (SATREPS)	—	1 (SATREPS) *no electricity	—		4	
	Downstream E.L.-400m	1 (UGM)	1 (SATREPS)	1 (SATREPS)	1 (BS)	1 (UGM)	1 (SATREPS)	1 (SATREPS)	1 (SATREPS) 1 (UGM)	1 (SATREPS)	1 (SATREPS)		7	
Sediment discharge						1 (SATREPS)							1	
Turbidity						1 (SATREPS)							1	
		Already installed					Not yet installed							1
IP Camera		1 (UGM)	1 (SATREPS)	1 (UGM)	1 (SATREPS)		1 (SATREPS)	2 (SATREPS)	1 (UGM)					

- Newly installed monitoring equipment(3 Rain gauges, 10 Water Level gauges, 10 IP Cameras) and existing monitoring equipment installed by UGM have been integrated into the Hydrological monitoring network.
- Data from those equipment has open to the public on the Internet(
<http://hydraulic.lab.cee-ugm.com/community-services/hydro-geotechnical-data-base/>)



About Us



Since the first time of the establishment, the laboratory has been supporting not only the undergraduate (Ir. Degree) education program, but also as supporting the hydraulics model test for various water resources development projects such as the development of dams, weirs, etc.

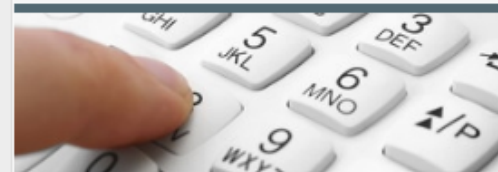
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International Cooperation



The laboratory has some reputations in conducting research through international collaborations. Several ones are considered as most distinct cooperation's, i.e.; the NEDECO of Nederland, the NIPPON KOEI of Japan and the YEC of Japan.

Contact Us



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Water Resources Management

Disaster Risk Management

Hydro-Geotechnical Monitoring
System

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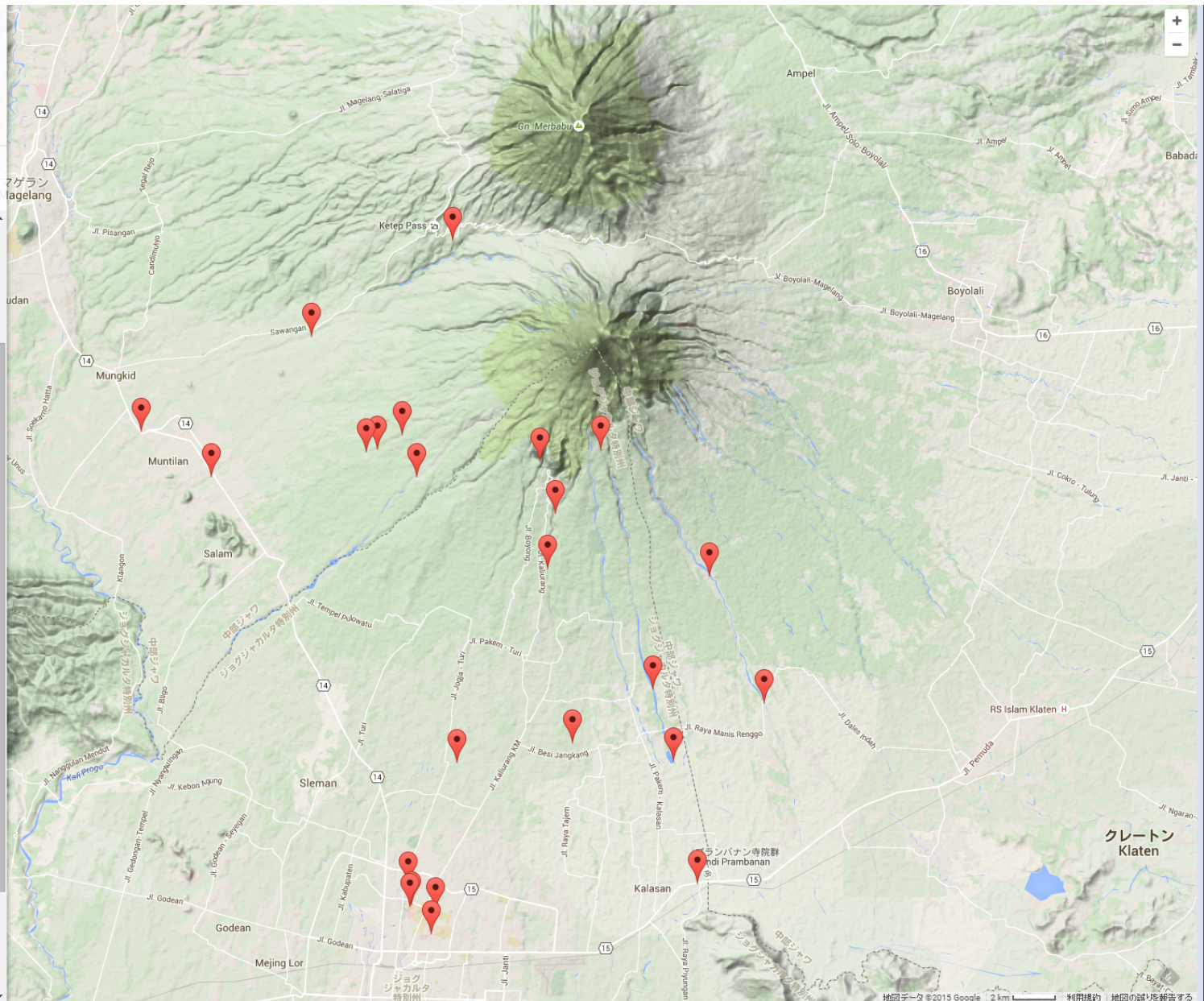


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Search

ARR 11 AWLR 16 CAM 15

BO/CO (Gemawang)	AWLR 0 mm CAM	1 Nov 15 13:29 1 Nov 15 13:29
BO/CO (UGM-Sipil)	ARR 0 mm/hr	13 Oct 15 05:40
BO/CO (UGM-Lembah)	ARR 0 mm/hr	9 Sep 15 12:50
BO/CO (UGM-MM)	AWLR 0 mm	23 Oct 14 21:05
GE (Kaliadem)	ARR 0 mm/hr	1 Nov 15 13:05
GE (Tempuran)	AWLR 468 mm CAM	22 Jul 15 00:11 29 Oct 15 19:00
GE-C (Plumbon1)	AWLR 469 mm CAM	1 Nov 15 05:11
GE/OP (Prambanan)	AWLR 243 mm CAM	1 Nov 15 14:00 1 Nov 15 13:32
KU-D (Ngipiksari)	ARR 0 mm/hr CAM	1 Nov 15 13:50 1 Nov 15 13:33
KU - RC3	AWLR 454 mm	1 Nov 15 13:40
KU - C6/C9	AWLR 383 mm CAM	1 Nov 15 13:39 1 Nov 15 13:33
PA (Ketep)	ARR 0 mm/hr	7 Sep 15 13:30
PA (Muntilan)	AWLR 0 mm CAM	1 Nov 15 13:38 1 Nov 15 13:33
PA-C1 (Talun)	AWLR 537 mm CAM	1 Nov 15 12:55 1 Nov 15 13:32
PU-D2	ARR 0 mm/hr	1 Nov 15 13:30
PU-C11	CAM	1 Nov 15 13:32
PU-C10 (Ngepos)	AWLR 3110 mm CAM	8 Sep 15 21:34 8 Sep 15 20:59
WO (Sukorini)	ARR 0 mm/hr	1 Nov 15 13:40
WO-C (Junut)	AWLR 437 mm CAM	1 Nov 15 13:47 1 Nov 15 13:33



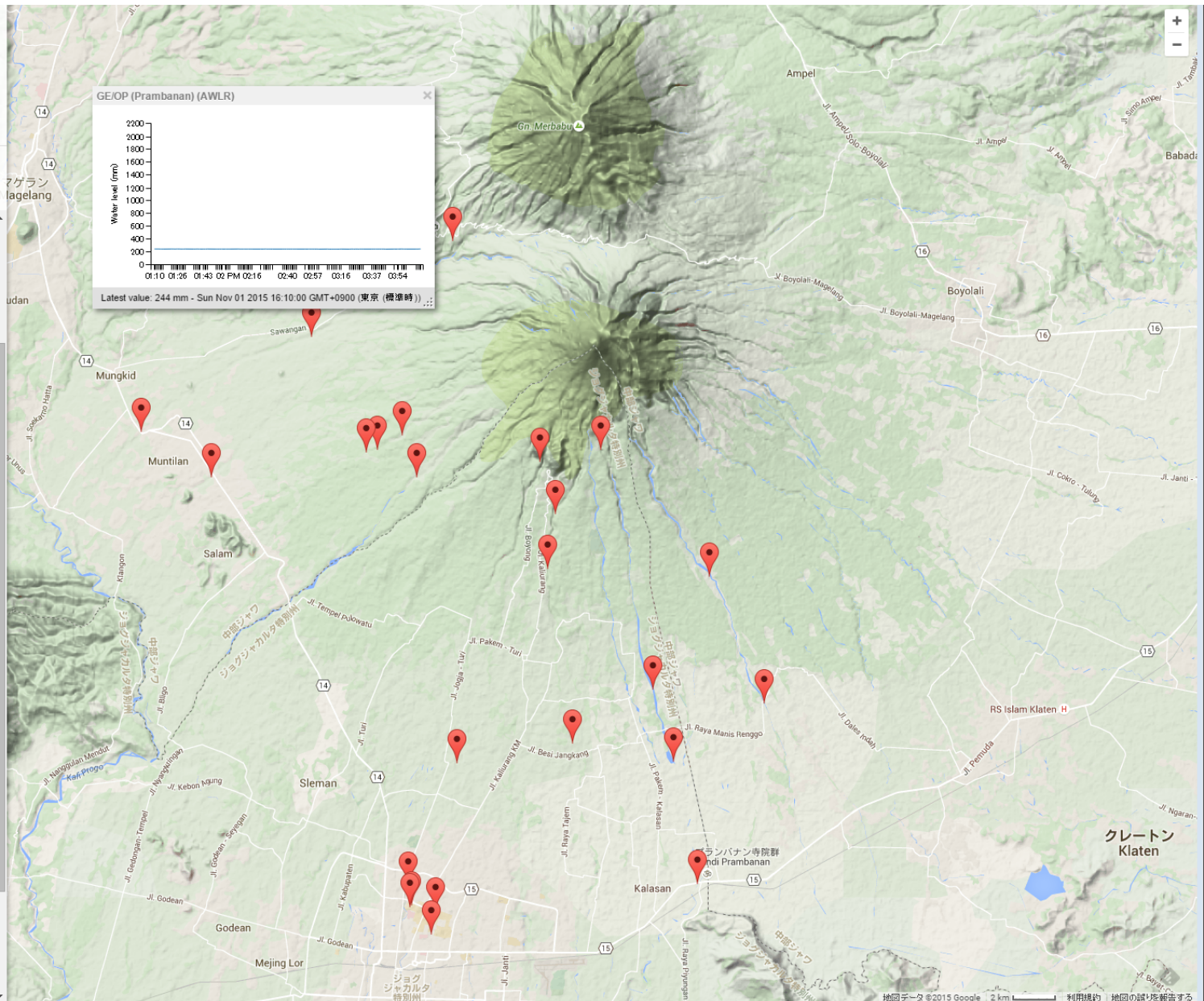
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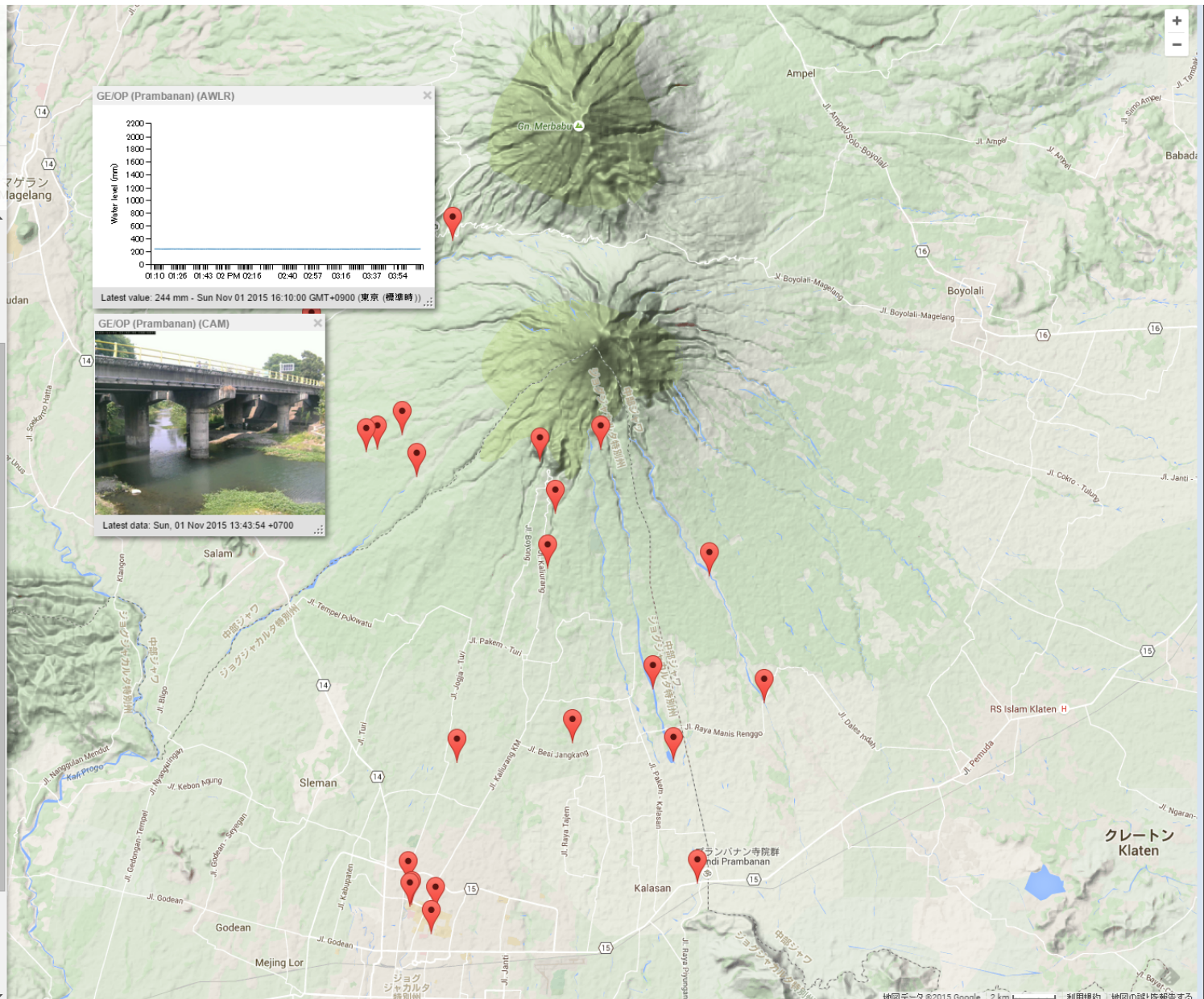
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- Data from those equipment has open to the public on the Internet(
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- Hopefully other existing monitoring equipment (installed by Balai SABO and BPPTK) will be integrated into the Hydrological monitoring network under SATREPS Project.

Next Action

- Install a sediment amount measuring device(Turbidity meter, Hydrophone) into K.Code until the end of this year.
- Maintain newly & existing installed equipment
- Collect data monitored by existing rain gauges and water level gauges and analyze them to figure out hydrological characteristics of 8 rivers on the south-western and southern flank of Mt.Merapi.

Thank you for your attention

