

Geodetic Contributions to IWRM-Projects in Middle Java, Indonesia

Günter Schmitt



Geodetic Institute
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study area Gunung Kidul



Gunung Sewu during the rainy season



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Gunung Sewu during the dry season



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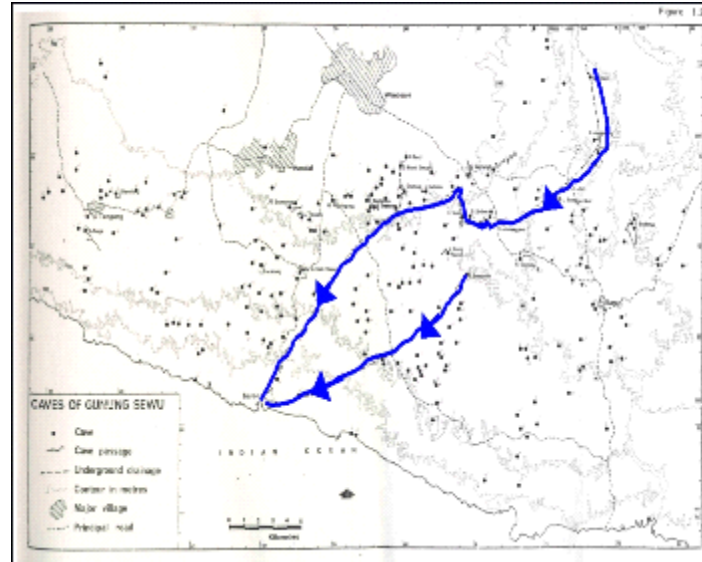


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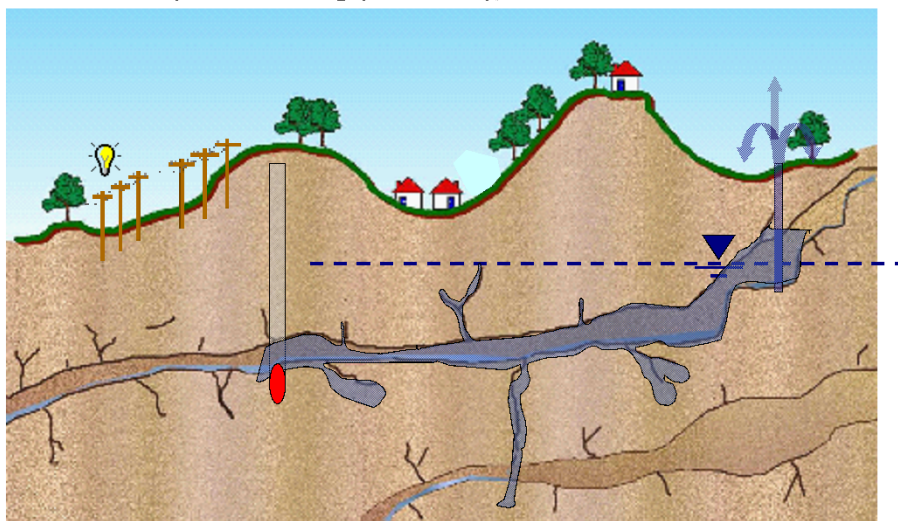
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underground river systems



water resources management

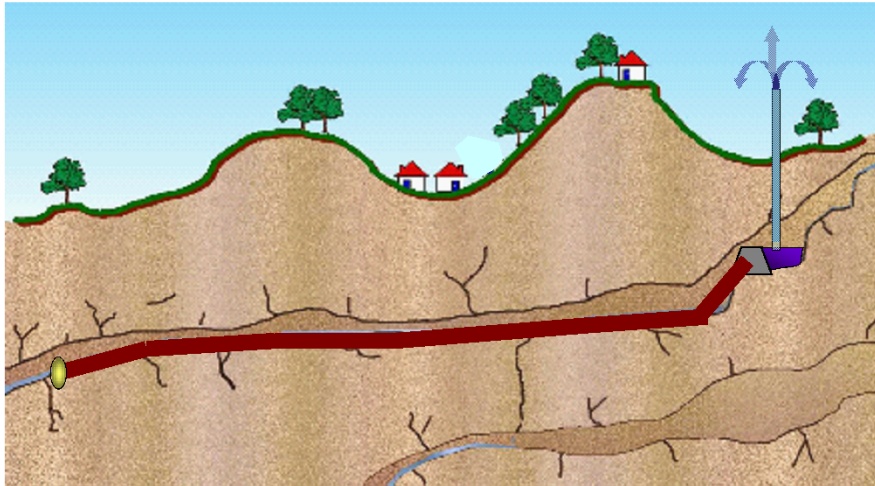
Variant 1: complete damming (schematic)



water resources management



Variant 2: weir and wooden pressure pipeline



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course of the cave Gua Bribin



key data : storage volume 400.000m³ / minimum flow 1.000l/s
potential water height \geq 15m / continuous pumping 70l/s
supply of the population with 80l/day



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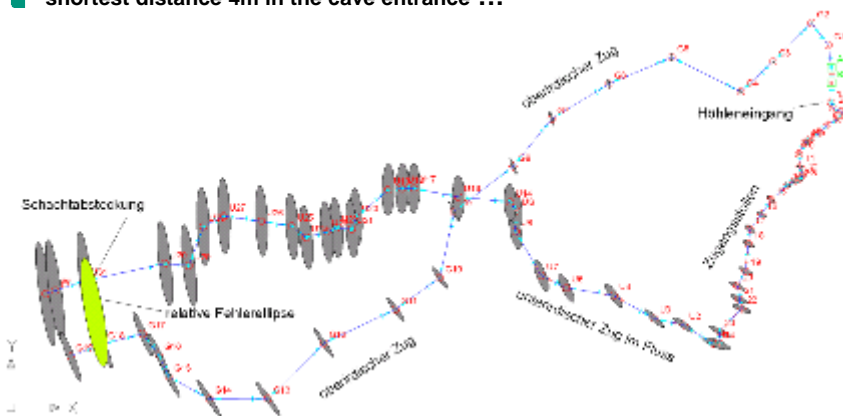


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polygon measurement



- 65 points, 2 x 1,5 km length, Leica TCR1102, mean point error 3 cm,
- relative break through ellipse 20x4 cm, nearly 100% humidity !!
- shortest distance 4m in the cave entrance !!!



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measurement in the lake region



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vertical drilling machine „VSM 2500“



break-through of the shaft drilling :
december 2004 in 98,4m depth
break-through accuracy : 7cm !!!



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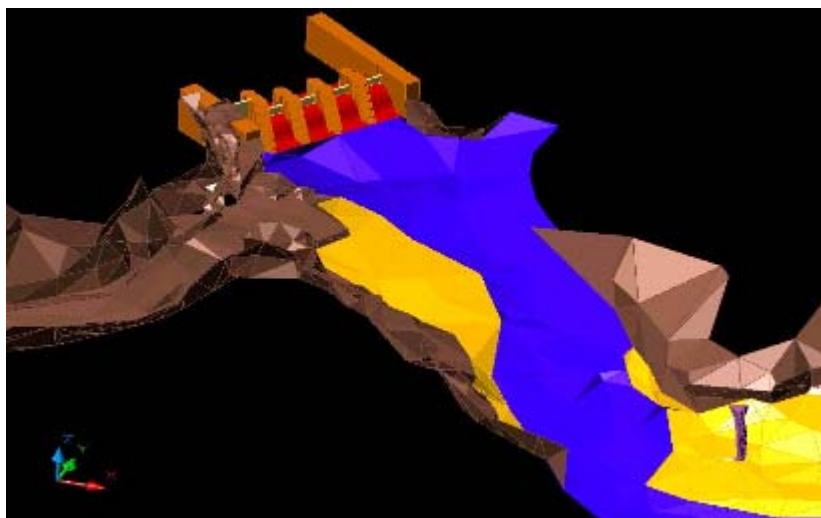


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existing weir near the cave entrance



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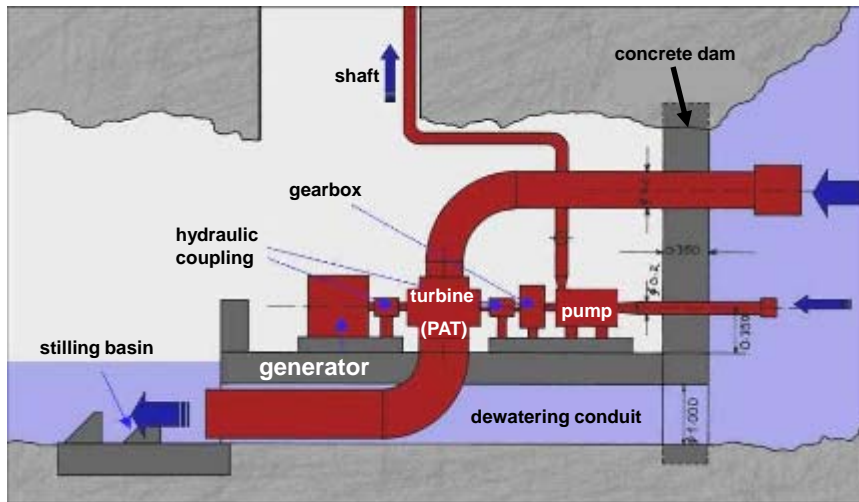


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microhydro power plant



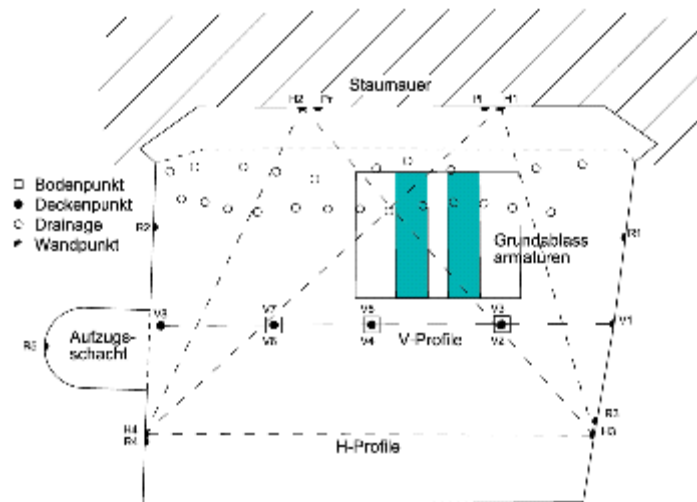
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dam monitoring network

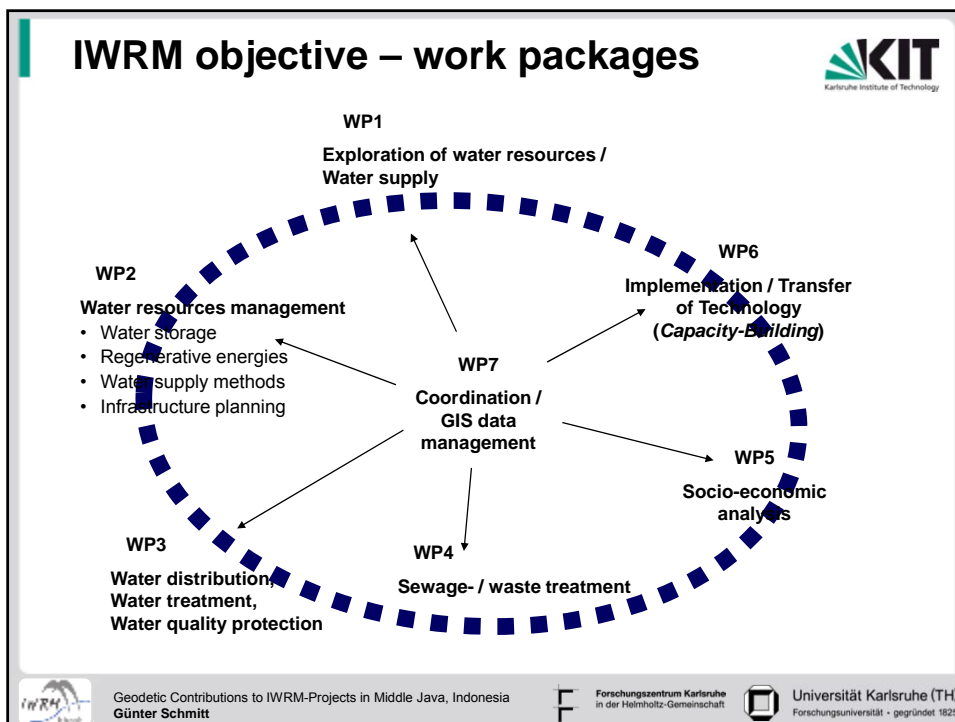
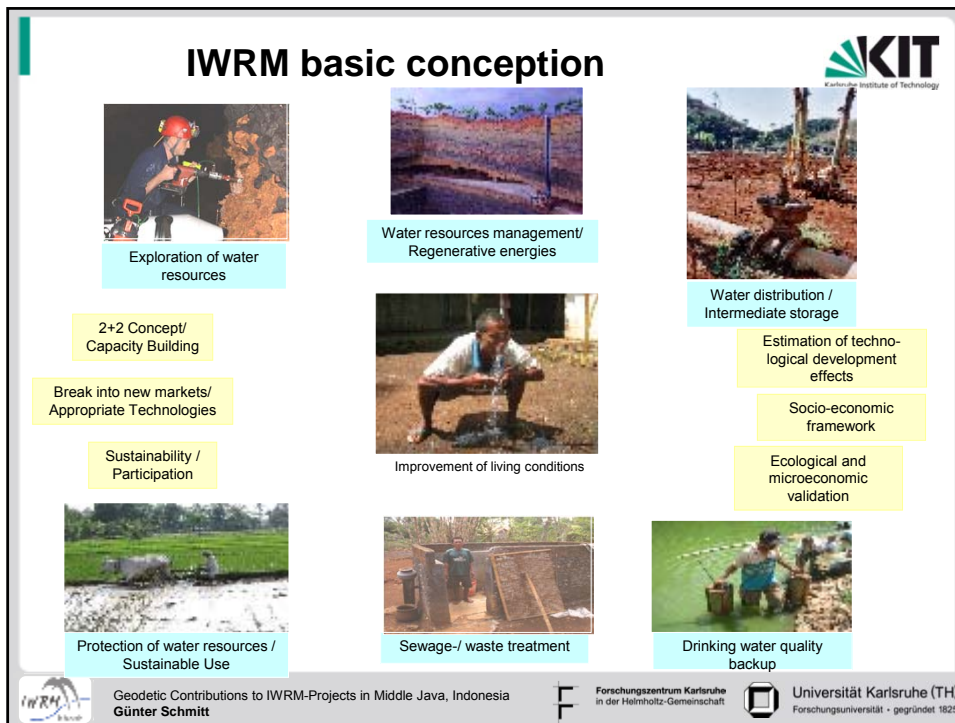


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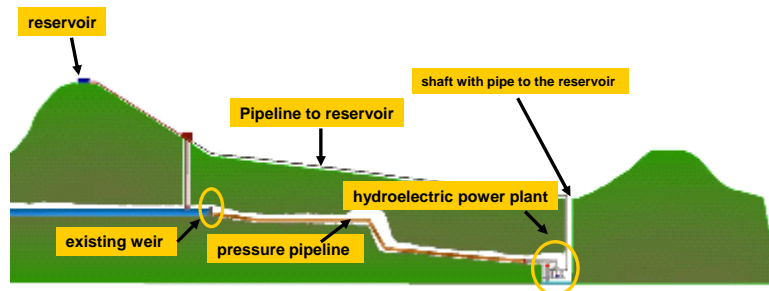
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pressure pipeline system Gua Seropan



polygon : 40 points, 620m in the cave, Leica TCRP 1201, vertical profiles
stake out of the test drilling point with RTK-GPS
detailed cave surveying with TLS by Leica HDS 6000



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TLS measurements Gua Seropan



- 22 instrument positions, 350 m cave length, height difference 20 m,
- cave breadth 3 – 15 m, cave height < 21 m, 4 days measurement,
- scan resolution in 20 m distance 6x6 mm²



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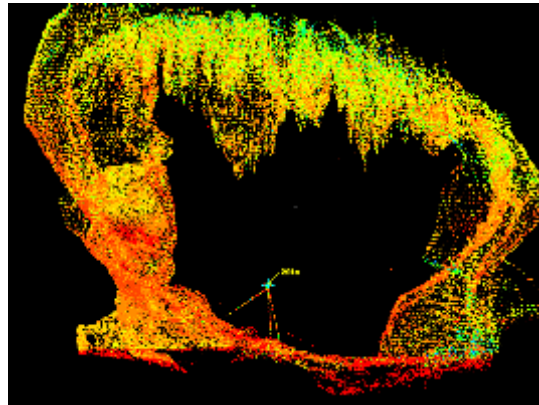


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TLS cross-section measurement



photo and TLS point cloud



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project related reference system



GPS-measurements :

2 Leica receivers GPS 1200

3 reference stations

10 reservoirs 2 x 1 h

data processing :

Online-service CSRS-PPP

Leica GeoOffice

ITRF2005 / EGM08



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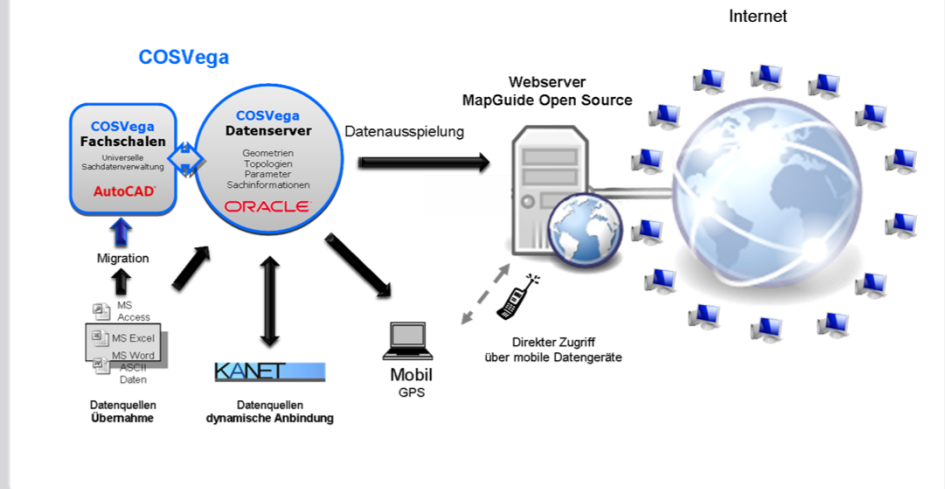


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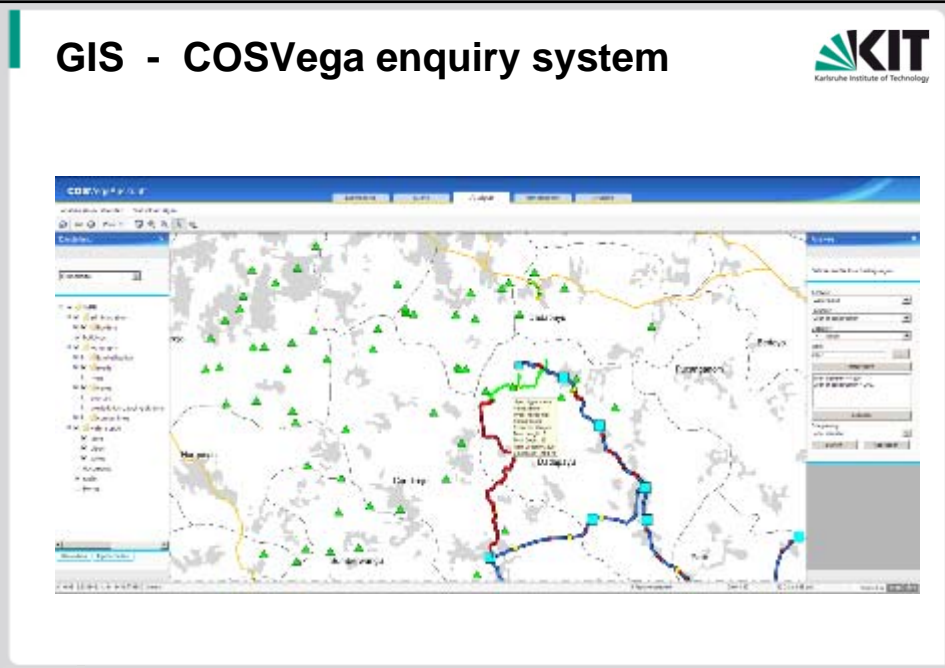


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GIS - COSVega-Struktur



GIS - COSVega enquiry system



georeferenced data in the IWRM-GIS



	raster data	vector data / coordinates	object data / alphanumeric	object data / documents	integrated software
thematic maps (topography, geology, hydrography, ...), satellite images	x				
water supply systems Bribin + Seropan (pipes, reservoirs, slides, pumps, ...)	x	x	x	x	
hydrological model for the analysis of water supply networks (KANET)					x
administrative boundaries, settlements, streets, rivers, land use, contour lines, ...		x			
statistical data (population, water consumption, buildings, level and distribution of income, ...)			x	x	
measurement results (geodetic + geotechnical surveying, rainfall, build-up pressure, temperature, water flow, ...)		x	x		
chemical (water quality), mineralogical, geological investigations + analyses		x	x	x	
investigations + analyses concerning drinking and waste water treatment		x	x	x	
caves (Bribin, Seropan, ...)	x	x	x	x	
technical plants (pumps, generators, turbines, water power plant Bribin, wooden pressure pipeline Seropan)	x	x	x	x	
meta-data (when?, who?, from whom?, where?, how?, ...)			x		
...					



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capacity building



- teaching in GPS-applications
- teaching in GPS-measurements
 - Gadjah Mada University Yogyakarta, Geodetic Department
 - Integration of students in project surveying
 - independant support in data collection concerning the local water supply and sewage systems



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
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Projektgebiet Motivation Projektverbund Geodät. Arbeiten „Cua Binbin“ Geodät. Arbeiten „Cua Beropan“ Medienleine Au dblick

Impressionen - Yogyakarta Region


 Mitarbeitende: 27 GdM - Marco Beyer - 1^{er} 21.10.16
 HT - 4 in Kooperation von Forschungszentrum Karlsruhe GmbH und Universität Karlsruhe (TH)


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Thank you very much for your attention



Merapi


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