PEAK GROUND ACCELERATION AT SURFACE FOR MATARAM CITY WITH A RETURN PERIOD OF 2500 YEARS USING PROBABILISTIC METHOD

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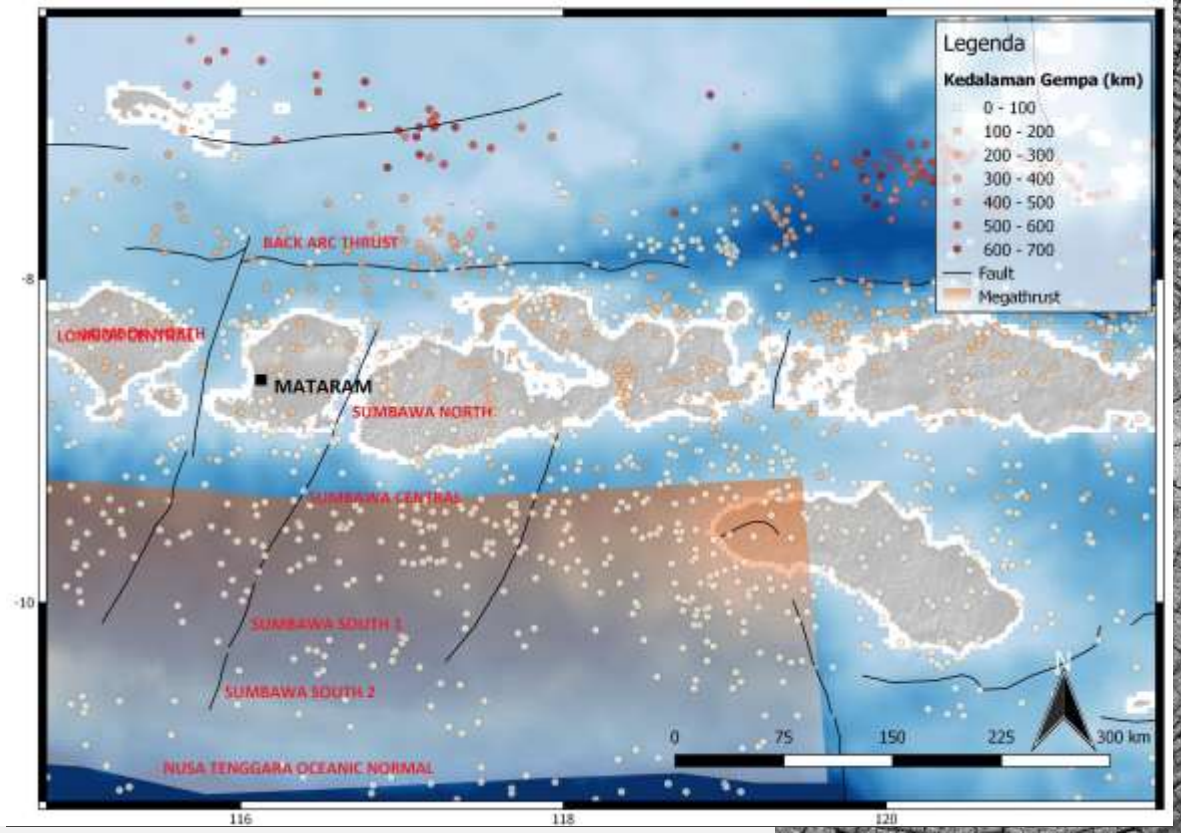
INTRODUCTION

- West Nusa Tenggara is an area that is prone to earthquakes because it is flanked by two earthquake sources, subduction zone and Back Arc Thrust zone.
- According to the Mataram Geophysics Station data, the 6.2 SR earthquake on June 6, 2016 has caused damage in Mataram and Central Lombok. Even in 2017 there have been 9 earthquakes felt with scale II-III MMI in Mataram City.

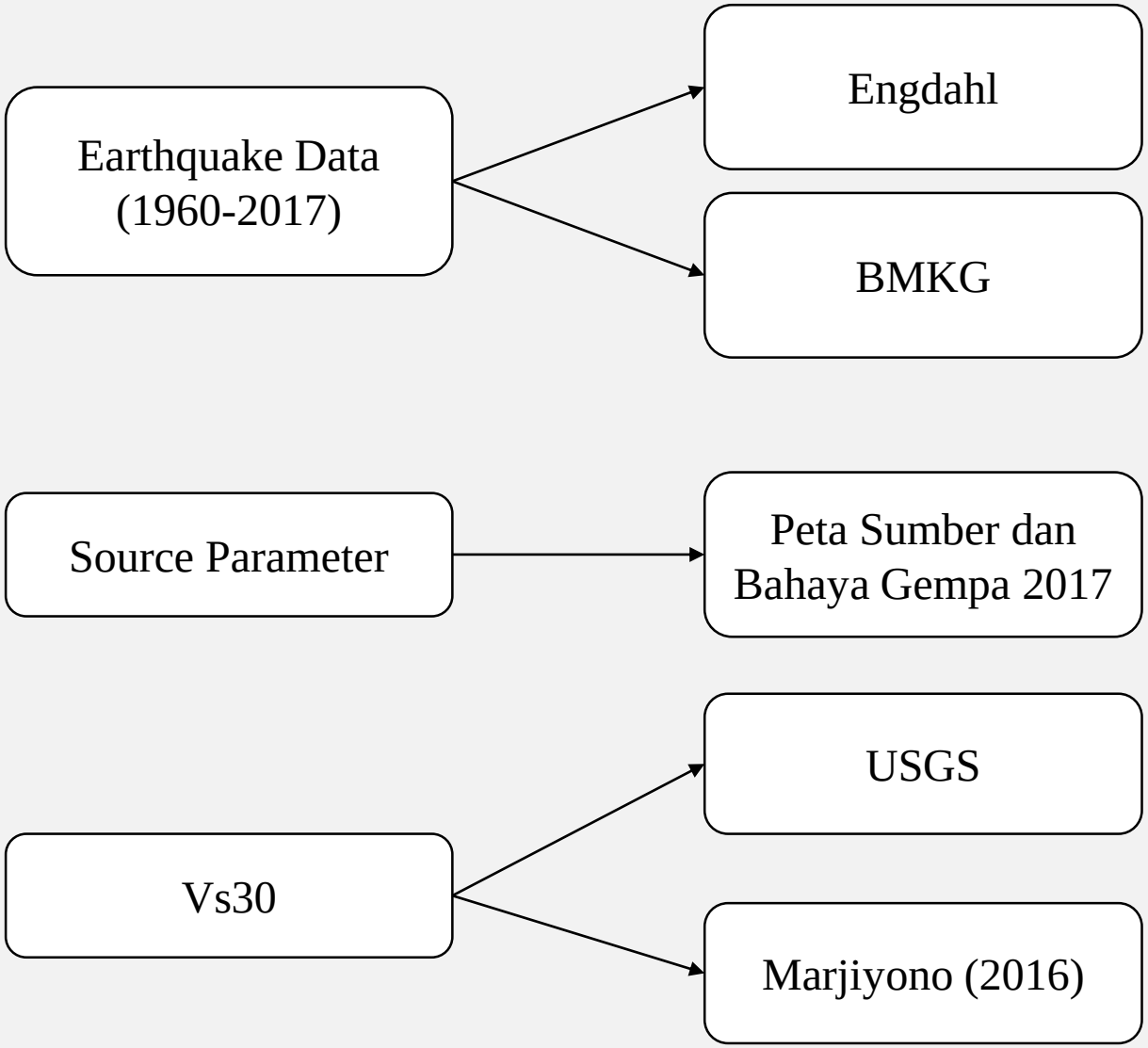


SEISMIC HAZARD ANALYSIS

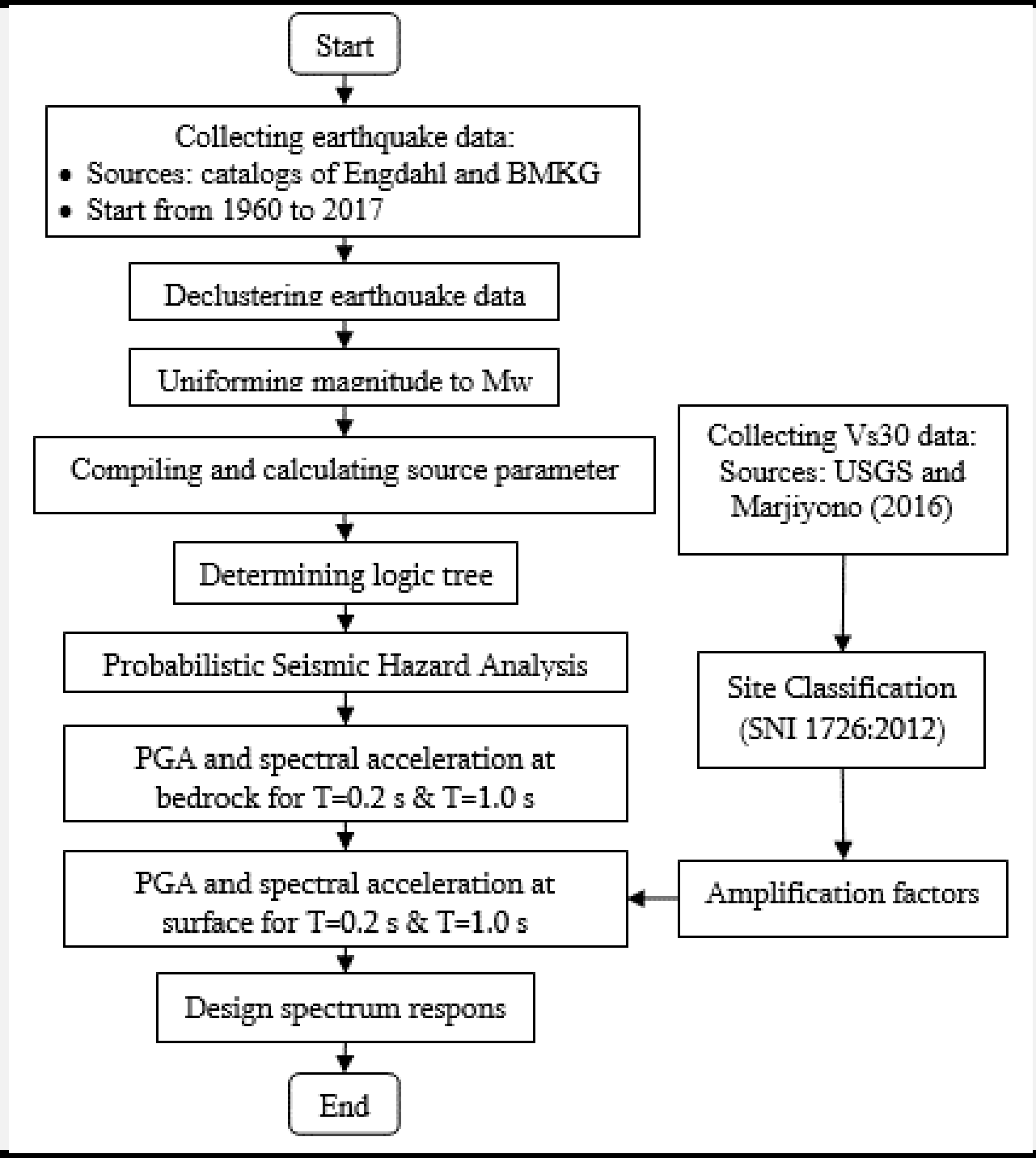
Peak Ground Acceleration & Spectrum Acceleration

at surface

DATA

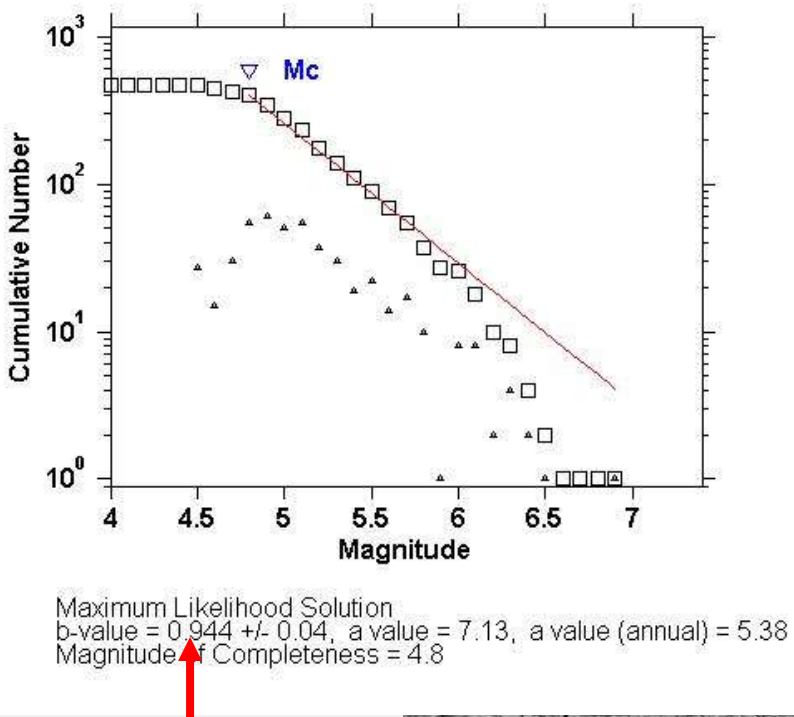

Earthquake Data
(1960-2017)
Engdahl
BMKG
Source Parameter
Peta Sumber dan
Bahaya Gempa 2017
Vs30
USGS
Marjiyono (2016)

FLOWCHART


Start
Collecting earthquake data:
• Sources: catalogs of Engdahl and BMKG
• Start from 1960 to 2017
Declustering earthquake data
Uniforming magnitude to Mw
Compiling and calculating source parameter
Determining logic tree
Probabilistic Seismic Hazard Analysis
PGA and spectral acceleration at bedrock for T=0.2 s & T=1.0 s
PGA and spectral acceleration at surface for T=0.2 s & T=1.0 s
Design spectrum respons
End
Collecting Vs30 data:
Sources: USGS and Marjiyono (2016)
Site Classification (SNI 1726:2012)
Amplification factors

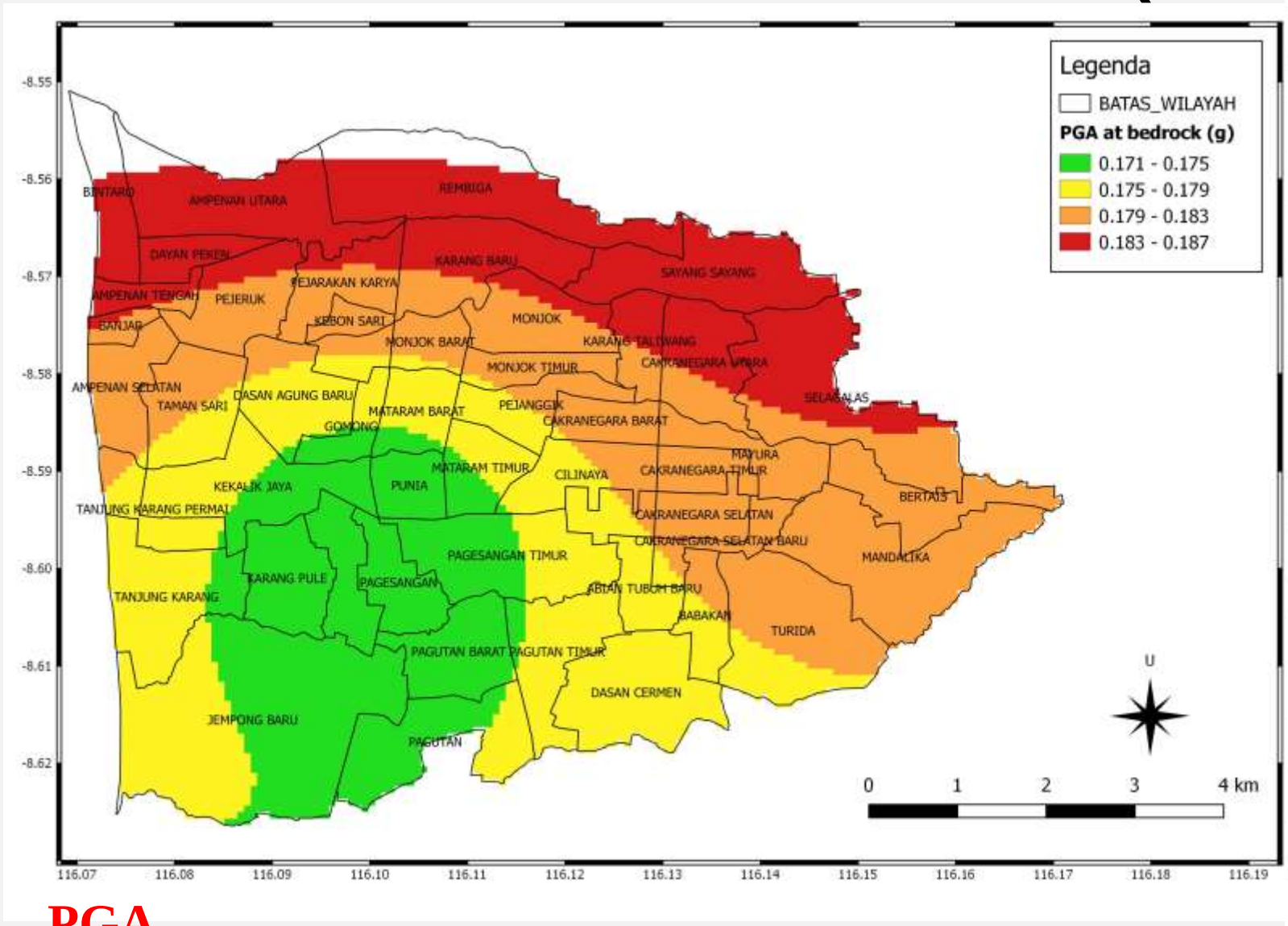
SOURCE PARAMETER

No.	ID	Name-segment	Dip	Length	Slip rate (mm/yr)	Top	Bottom	Mmax	Width
1	19	Flores Backarc Thrust-Lombok	45	310	9.9	3	18	8.0	18.5
2	27	Nusa Tenggara oceanic normal fault	60	540	0.5	3	18	7.8	17.9
3	84	Sumbawa strait strikeslip fault-north	90	79	0.5	3	18	7.3	11.9
4	85	Sumbawa strait strikeslip fault-central	90	104	0.5	3	18	7.4	12.1
5	86	Sumbawa strait strikeslip fault-south 1	90	40	0.5	3	18	6.9	10.9
6	87	Sumbawa strait strikeslip fault-south 2	90	47	0.5	3	18	7.0	11.2
7	89	Lombok strait strikeslip fault-north	90	156	0.5	3	18	7.5	12.3
8	92	Lombok strait strikeslip fault-central	90	133	0.5	3	18	7.5	12.3
9	99	Java Megathrust-Bali		500	4.0			9.0	200

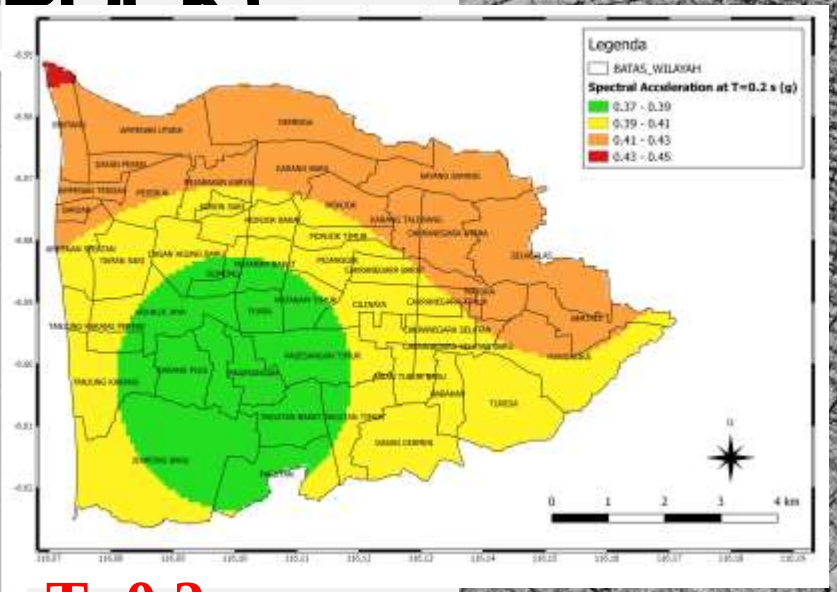


b value

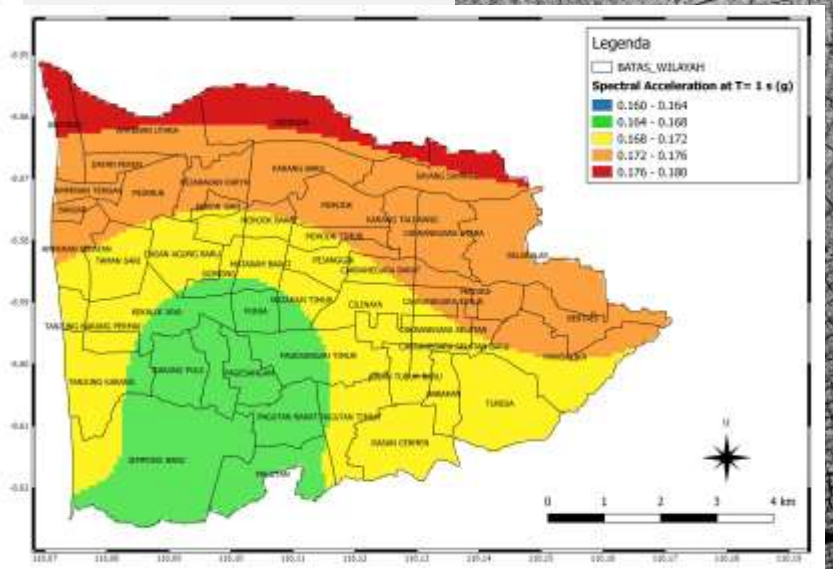
PGA & SPECTRAL ACCELERATION (BEDROCK)



PGA

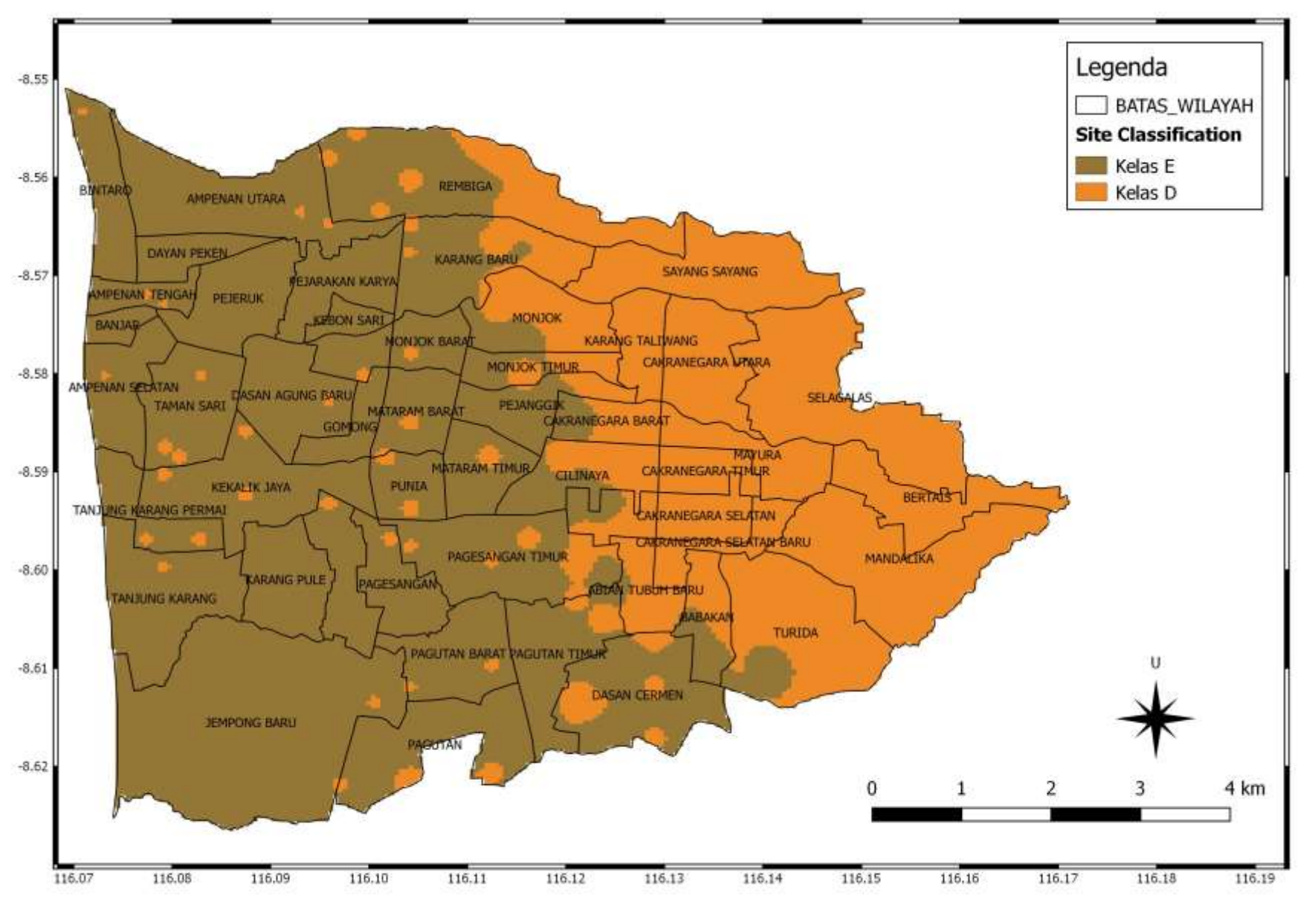


T=0.2 s

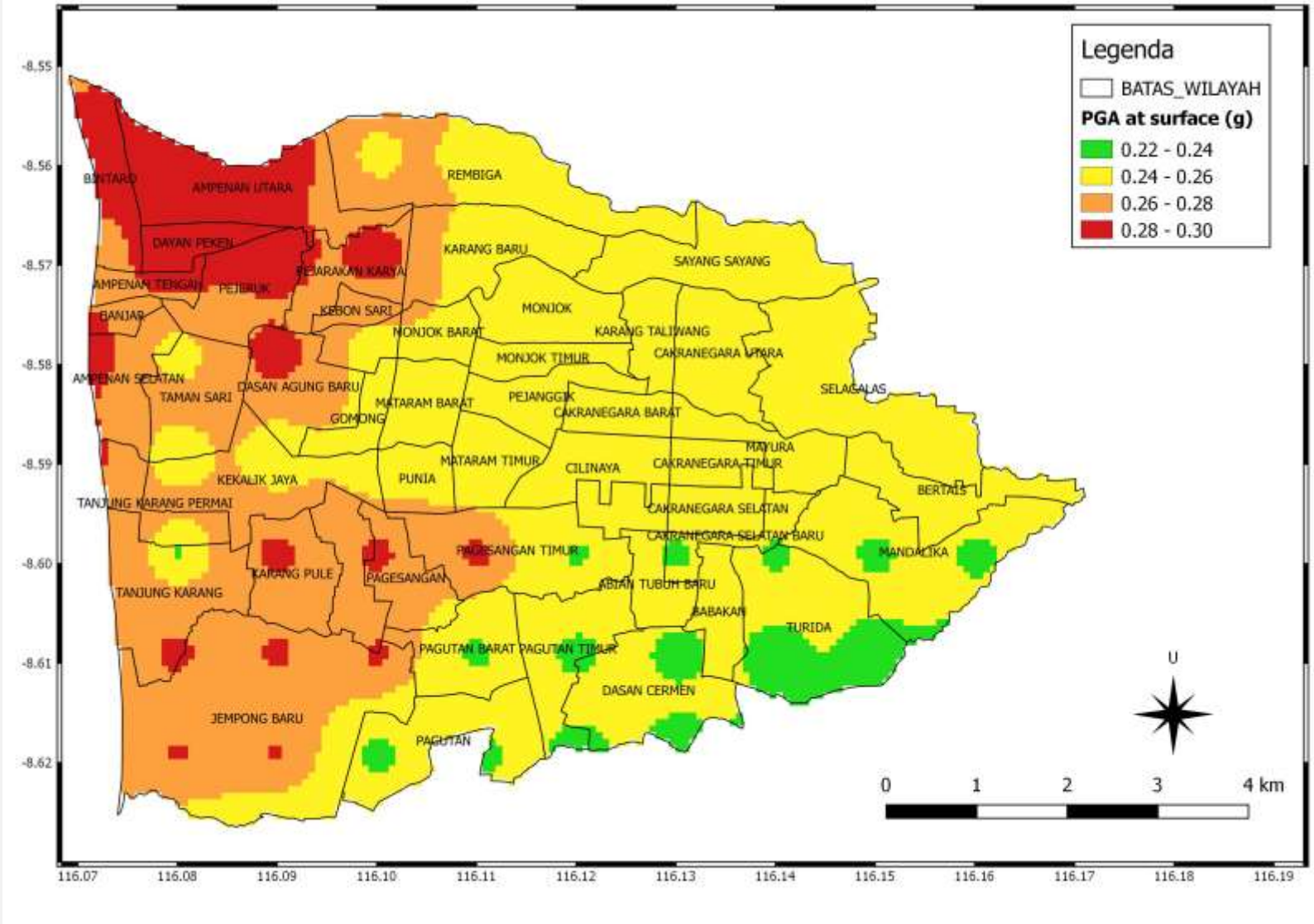


T=1.0 s

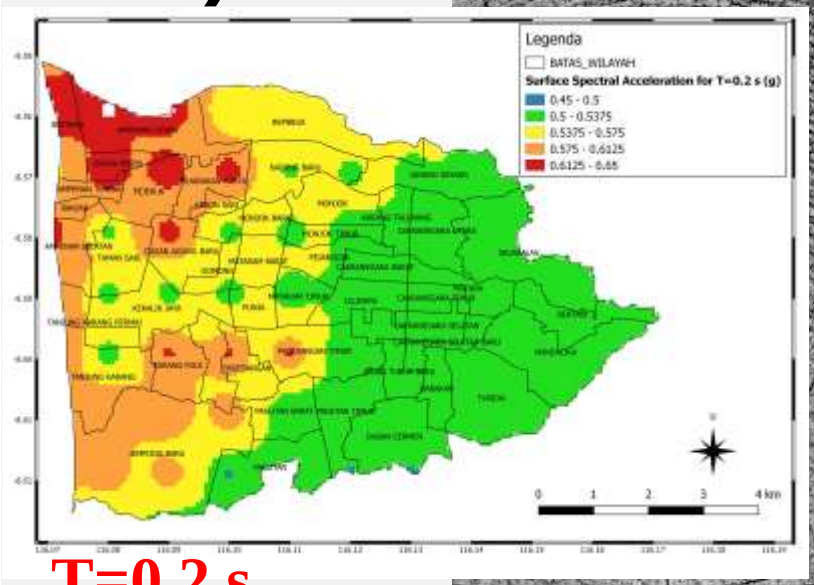
SITE CLASSIFICATION



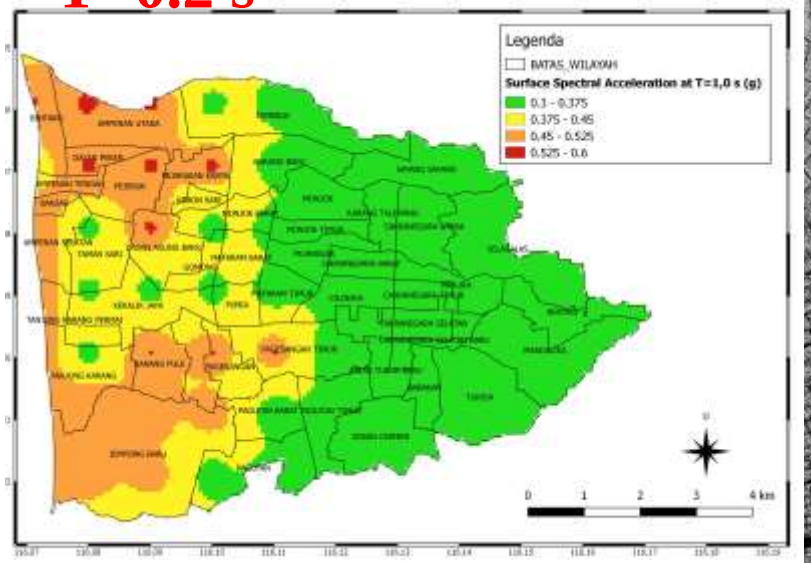
PGA & SPECTRAL ACCELERATION (SURFACE)



PGA

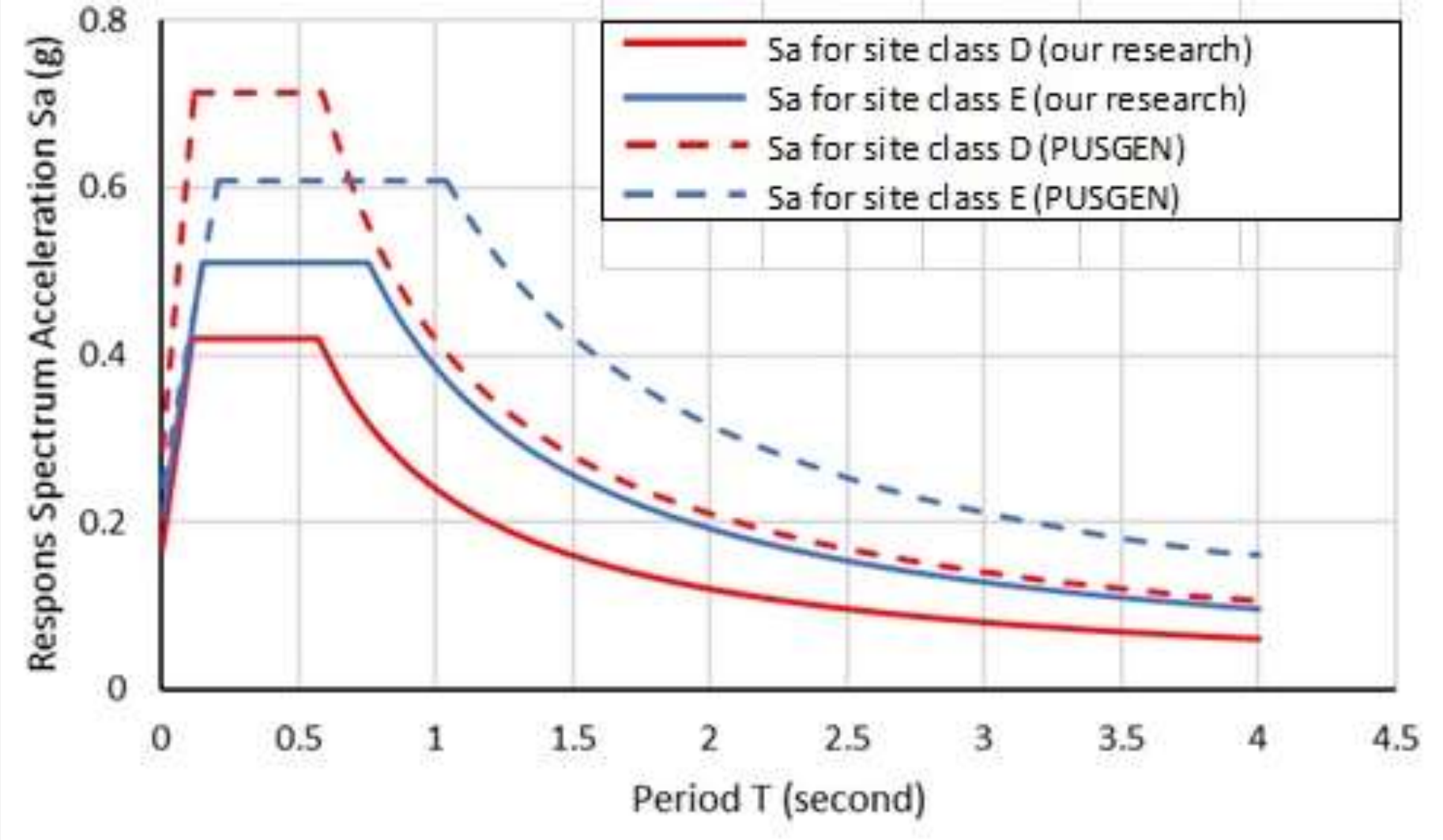


T=0.2 s



T=1.0 s

RESPONSE SPECTRUM



CONCLUSION

- North area of Mataram has larger PGA, Ss, and S1 value than southern Mataram which caused by dominance of Back Arc Thrust north of the city.
- Ampenan Utara village is area with largest PGA_M, S_{MS}, and S_{M1}, which is mostly caused by how close it with back arc thrust and dominated with E class soil. While the lowest PGA_M, S_{MS}, and SM1 area is located at Turida village which relatifly away from Back arc thrust and has D class soil.
- Peak design respons spectrum of Mataram for D class site is 0.42 g at 0.114-0.571 s, while for E class is 0.51 g at 0.15-0.75s. These values are really important in purpose to plan earthquake resistant building and risk category determination

THANK YOU

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