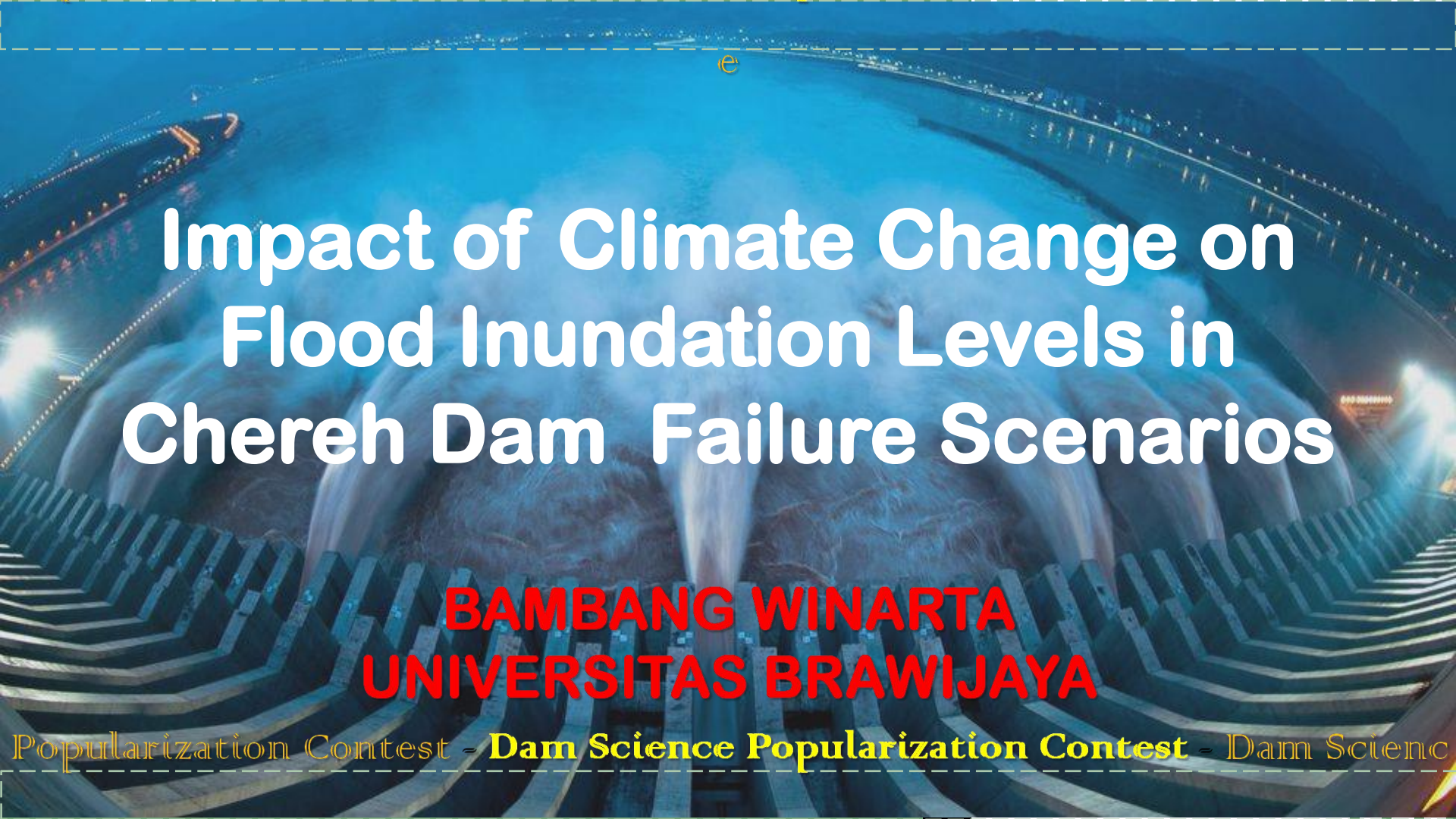

Impact of Climate Change on Flood Inundation Levels in Chereh Dam Failure Scenarios

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Introduction

01

Present historical extremes events are more frequently
more region
more strong
This fact verifies that
climate change exists.

02

The changing of climate pattern will trigger the possibility of dam failure with more severe damage and higher risk.When a dam breaks, a large amount of water will be stored into the downstream part.

03

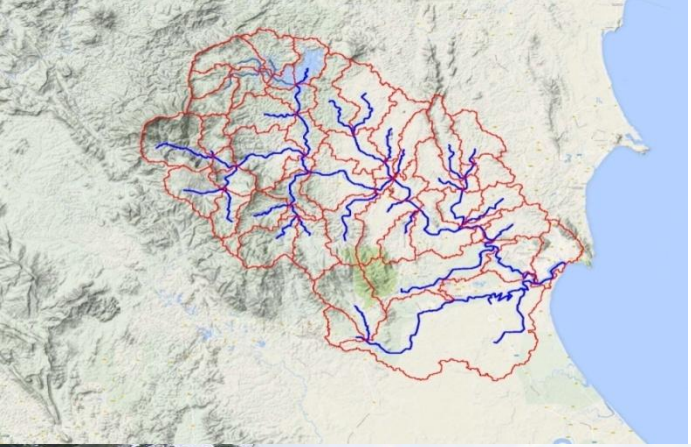
A dam break study consists of :
- precipitation analyses;
- hydrologic modeling;
- dam breaching analysis;
- dam break floodwave routing;
- flood inundation mapping.

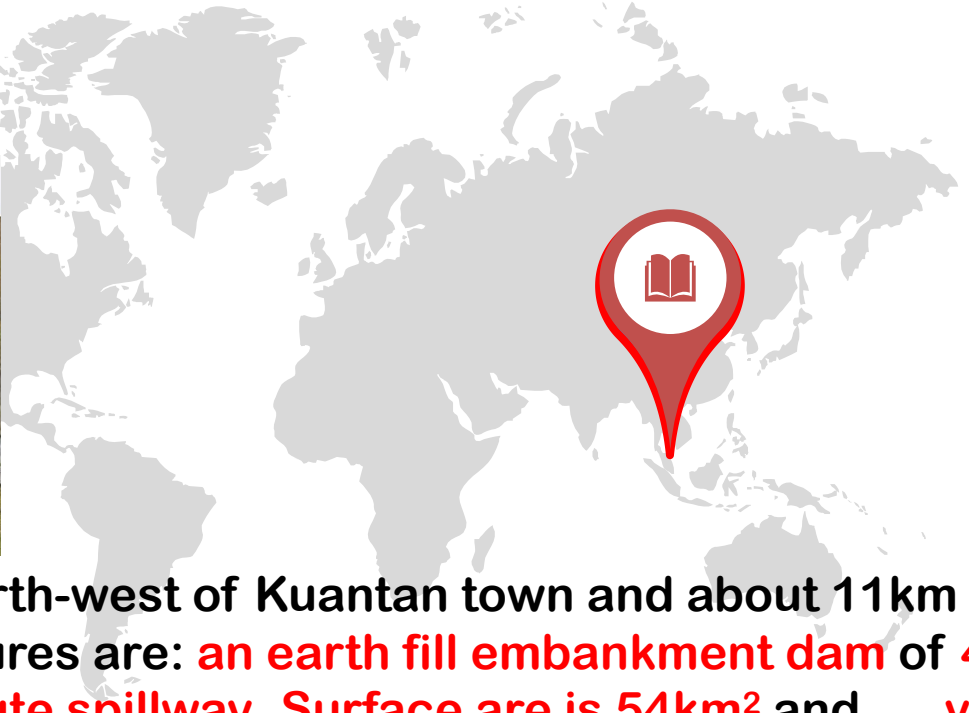
04

HEC-HMS to perform the hydrology, and HEC-RAS to perform hydraulics, and inundation mapping of flood due to dam break for some design scenarios

Introduction

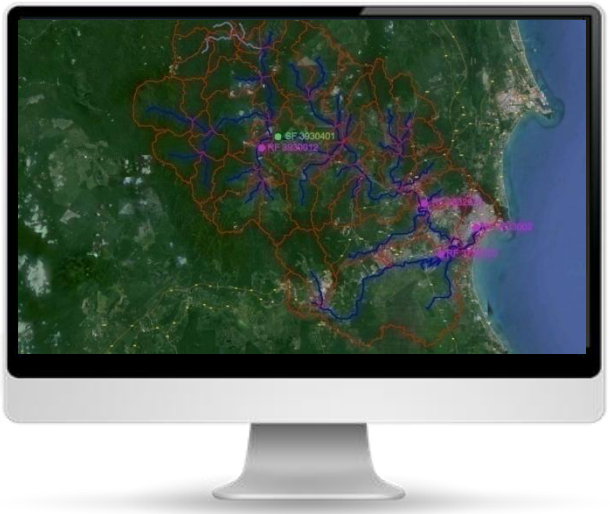
Location of Study

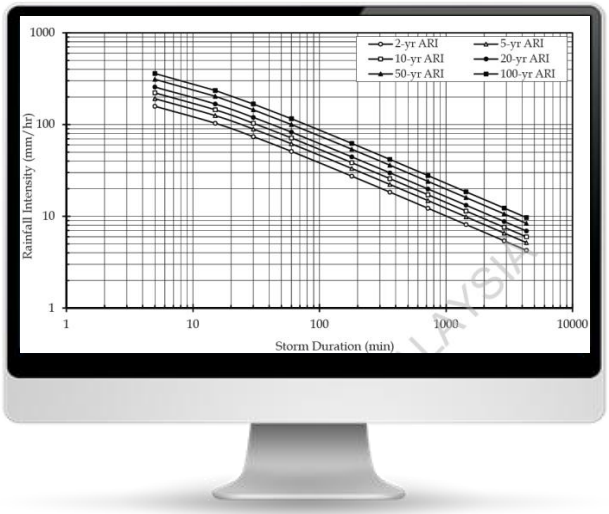




Chereh Dam is located about 40km north-west of Kuantan town and about 11km north of Lembing River. The main features are: an earth fill embankment dam of 48m high with a 50m width un-gated chute spillway. Surface are is 54km^2 and volume is 250 x 10^6 m^3

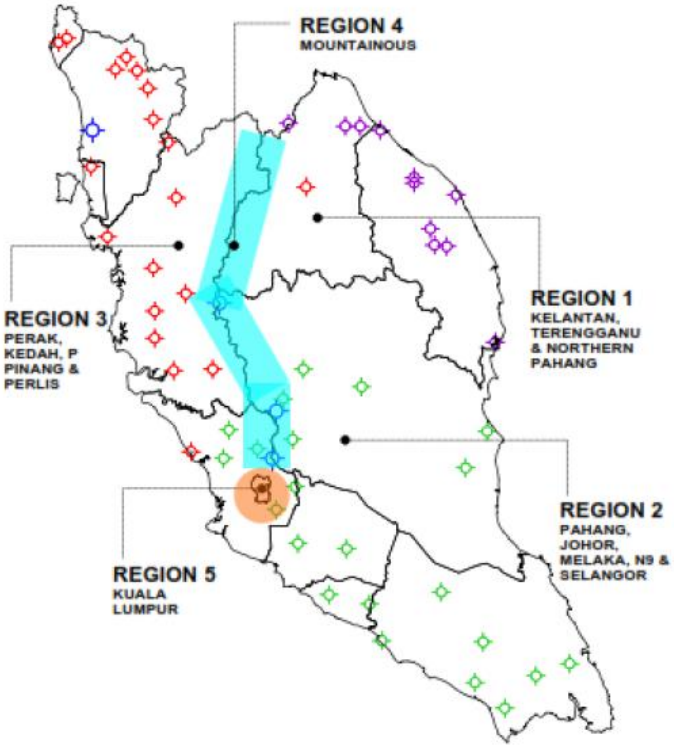
Precipitation Analyses and CC
F





Kuantan River basin has:
4 (four) rainfall stations (RF) and 1 (one) streamflow station (SF) at junction of Lembing River and Kuantan River

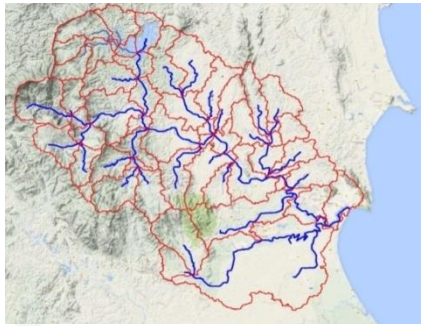
Precipitation Analysis and CC
F



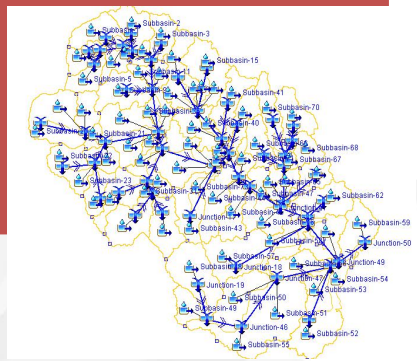
CCF = 1.41 for 50 years ARI
CCF = 1.46 for 100 years ARI

State	No	Station ID	Station Name	Climate Change Factor							
				Return Period, T							
				2	5	10	20	25	50	100	200
Pahang	1	4127001	Hulu Tekai Kwsn B	1.09	1.16	1.20	1.22	1.23	1.26	1.27	1.29
	2	3424081	JPS Temerloh	1.17	1.27	1.33	1.38	1.40	1.44	1.48	1.51
	3	4223115	Kg. Merting	1.24	1.35	1.41	1.46	1.47	1.51	1.55	1.58
	4	4023001	Kg. Sungai Yap	1.19	1.32	1.39	1.45	1.47	1.52	1.57	1.61
	5	3628001	Pintu Kaw. Pulau Ketam	1. 16	1.38	1.49	1.56	1.58	1.62	1.64	1.65
	6	3924072	Rumah Pam Paya Kangsar	1.2	1.33	1.40	1.46	1.47	1.52	1.56	1.59
	7	3533102	Rumah Pam Pahang Tua	1.02	1.19	1.27	1.34	1.36	1.41	1.46	1.50
	8	3818054	Setor JPS Raub	1.12	1.21	1.27	1.31	1.33	1.37	1.40	1.43
	9	3121143	Simpang Pelangai	1.08	1.22	1.29	1.36	1.38	1.43	1.48	1.53

Hydrological Modeling



Hydrological Model Scheme



Hydrological Model Calibration Procedures

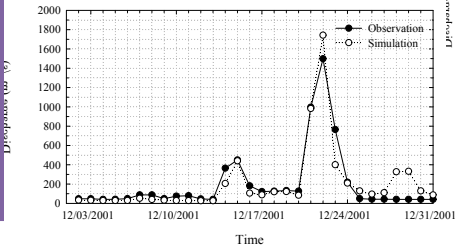
$$T_c = 2.32A^{-0.1188}L^{0.9573}S^{-0.5074}$$

$$R = 2.976A^{-0.1943}L^{0.9995}S^{-0.4588}$$

$$Q_B = 0.11A^{0.85889}$$

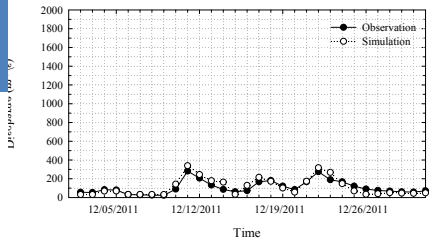
$$S = \left[\frac{\sum I_i\sqrt{S_i}}{\sum I_i}\right]^2$$

Calibration Result



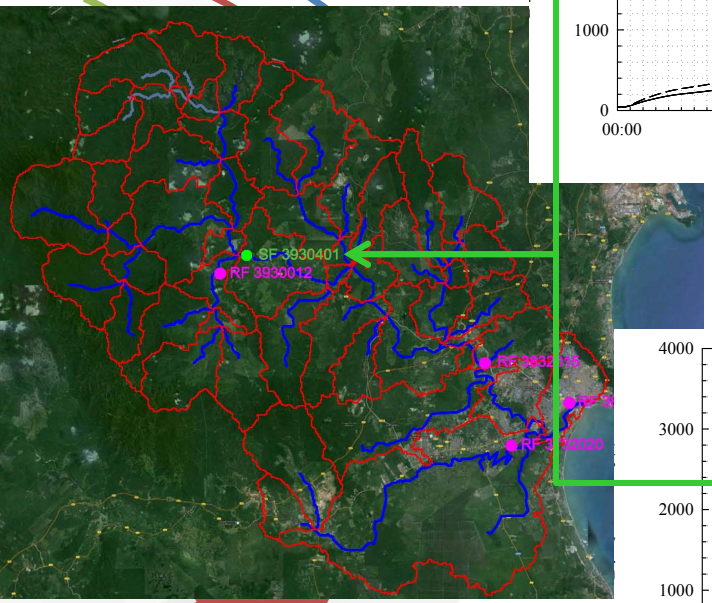
NSE = 0.865
R^2 = 0.968

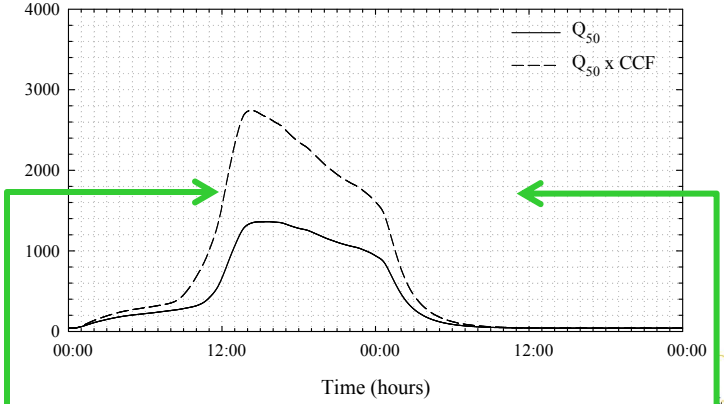
Confirmation Result

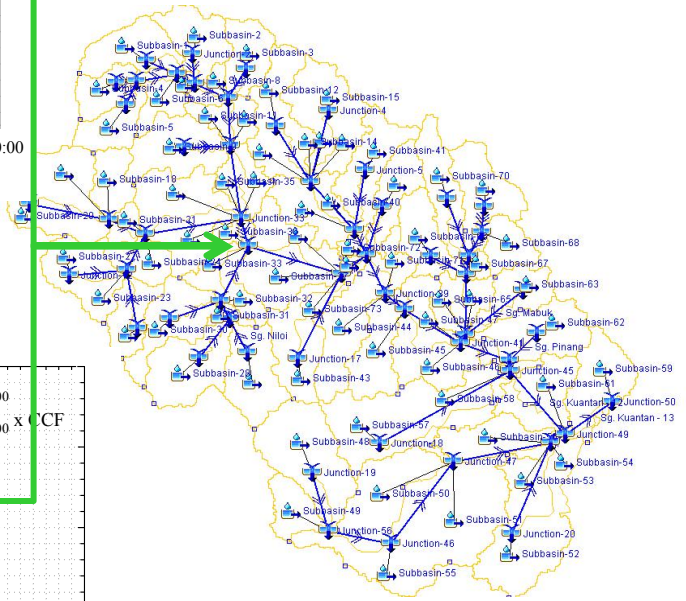


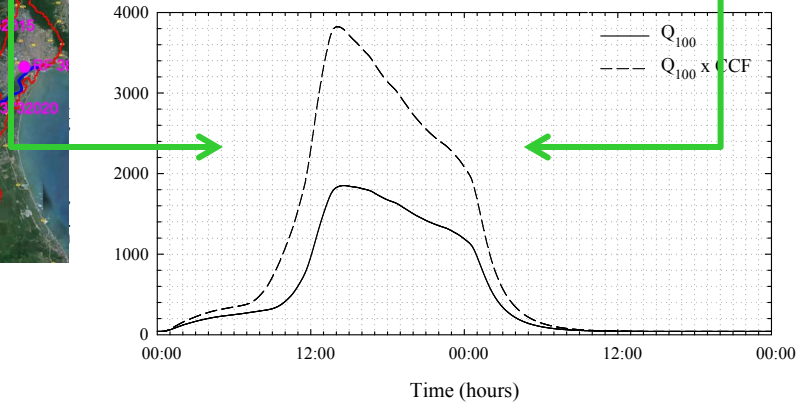
NSE = 0.896
R^2 = 0.980

Hydrological Modeling



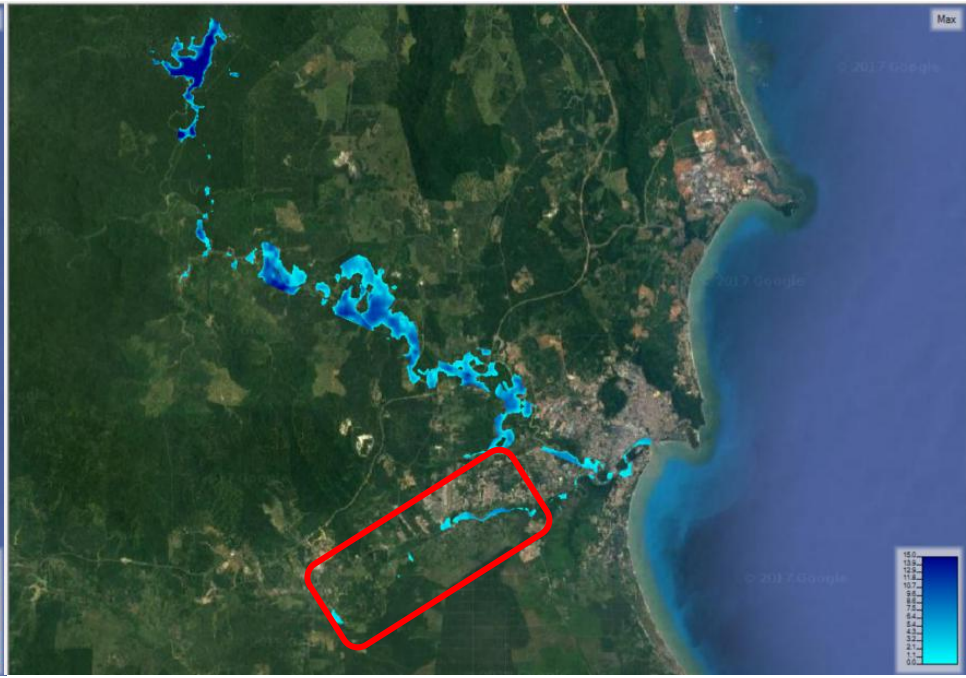






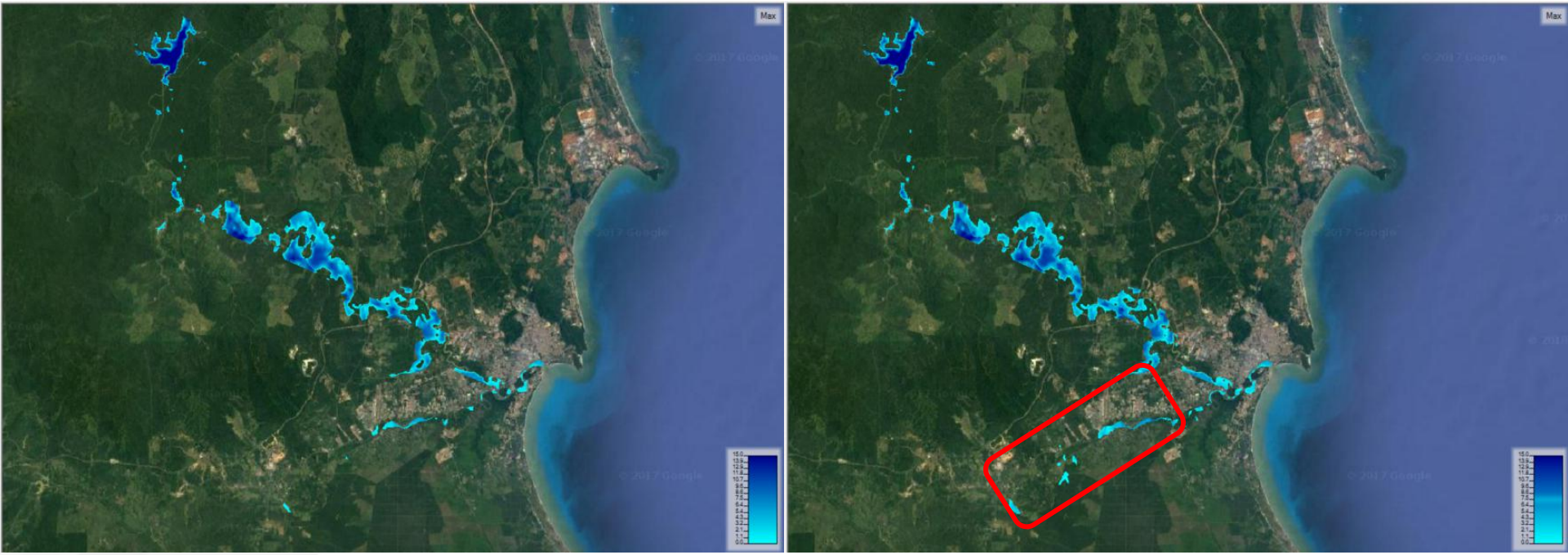
Hydraulic Modeling

Flood Inundation Map due to Chereh Dam Break wi th 50 years ARI (x CCF)



Hydraulic Modeling

Flood Inundation Map due to Chereh Dam Break wi
th 100 years ARI (x CCF)



Conclusions

Two scenarios have been simulated for Chereh Dam failure: during heavy rainfall of 50 and 100-years ARI with CCF

Inundation maps were developed used HEC-RAS in order to show the level of Chereh Dam downstream floodwaters.

City or state governments have to prepare informative a nd instructive map of the potential areas that would be flooded due to dam-break failures and also the saf ety areas.

Then, some precautions should be taken by the city or state government to avoid or to minimize the hazards of dam failure.


Thank you