Stakeholder Workshop

Johor Bahru, Malaysia
24 April 2025

Mark Hegnauer

Christian Alfonsus Liguori

Rizka Akmalia

Agenda

Wifi
User ID:
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Session 1 (08:30-12:30)

08:30 - 09:00	Registration
09:00 - 09:15	Welcome and Introductions
09:15 - 09:45	Presentation: New Developments in MHP-IM
09:45 - 10:30	Demonstration of Final Prototype
10:30 - 10:45	Coffee break
10:45 - 11:30	Q&A and Feeback Session
11:30 - 12:30	Handover of MHP-IM & User Manual

Lunch break (12:30-14:00)

Session 2 (14:00-16:00)

14:00 - 15:30	Overview of afternoon session, User needs & information requirements session
15:30 - 16:00	Wrap-up & next step

About the project

The Climate Technology Centre and Network (CTCN) supports the Development of a **Multi-Hazard Platform** for forecasting local level climate extremes and physical hazards for Iskandar Malaysia.

The objective of the Technical Assistance (TA) is to enable Iskandar Malaysia to take early actions to mitigate climate risk through a decision support system designed in an inclusive manner and based on the understanding of the local **level climate extremes** and their impacts by integrating them into a prototype Multi-Hazard Platform (MHP) **focusing on coastal hazards**.

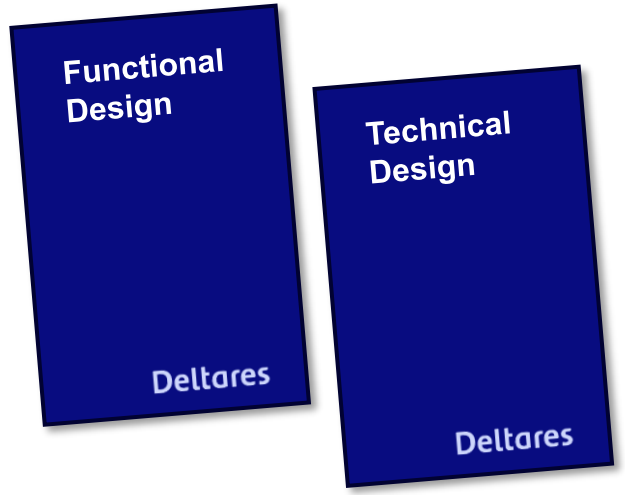
About the project

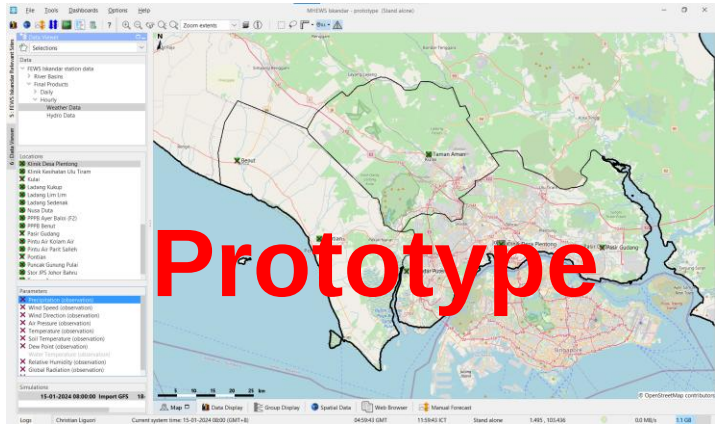
The overall goal of the project is to:

Develop technical specifications to design and integrate information on local climate extremes and hazard risks in a **multi-hazard platform** (MHP) for Iskandar Malaysia (IM)

Develop a **prototype** and establish the **financing requirements** to operationalize the MHP for IM

Improve local capacities in implementing a people-centred forecasting system using social innovation.





Capacity building

About the project

Workshop 1: 11 March 2024

Discussion session with data providers: 24 June 2024

Workshop 2: 10 Dec 2024

Workshop 3: Now

Functional and Technical Design

Deltares

Functional and Technical Design

Updated

Deltares

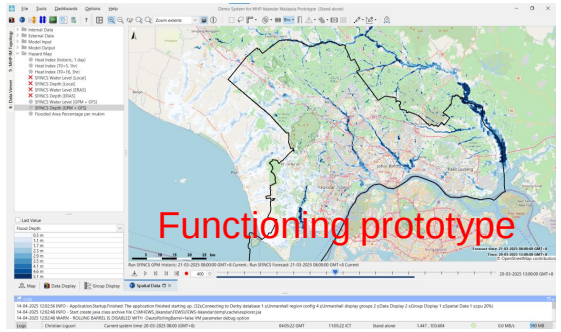
MHP-IM User Manual

Deltares

+

11 Mar 2024

10 Dec 2024

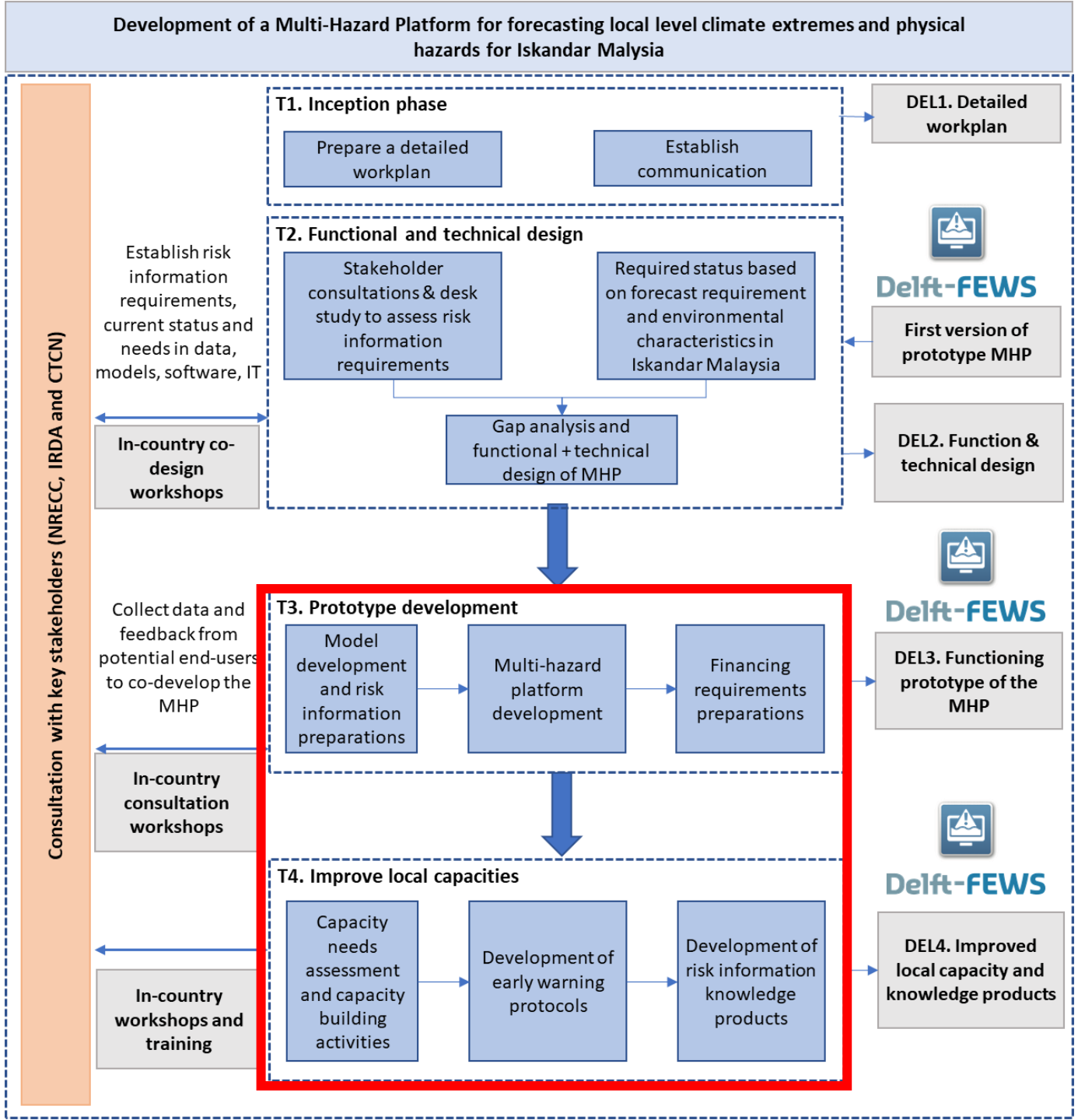


About the project

Now:
End of Phase 3 + start of phase 4

Next:

- Develop knowledge products – Phase 4



Project Development

MHP-IM Main Document

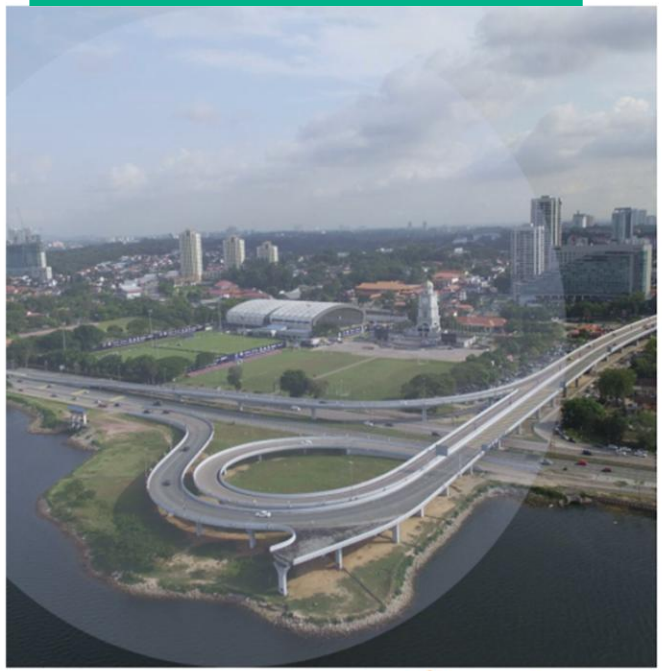
DRAFT

UTM Deltares

Development of a Multi-Hazard Platform (MHP) for forecasting local level climate extremes and physical hazards for Iskandar Malaysia

Functional Design and Prototype Development Report

First doc.



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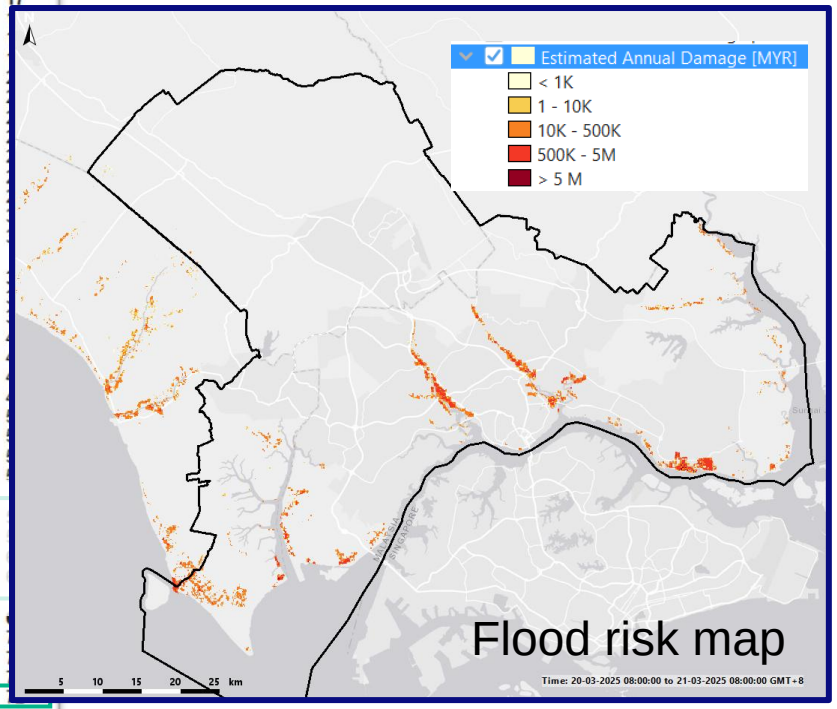
D.3.1
Working MHP prototype + user manual

D.3.2 Report on financing needs



Flood risk map

MHP-IM User Manual (D.3.1.)

DRAFT

UTM Deltares

Development of a Multi-Hazard Platform (MHP) for forecasting local level climate extremes and physical hazards for Iskandar Malaysia

MHP-IM User Manual Complementary doc.

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3 MHP-IM Explorer

3.1 Overview

One of the main windows of the system is the FEWS Explorer shown in **Figure 3.1** below. In this case it is the Map window or Map Display.

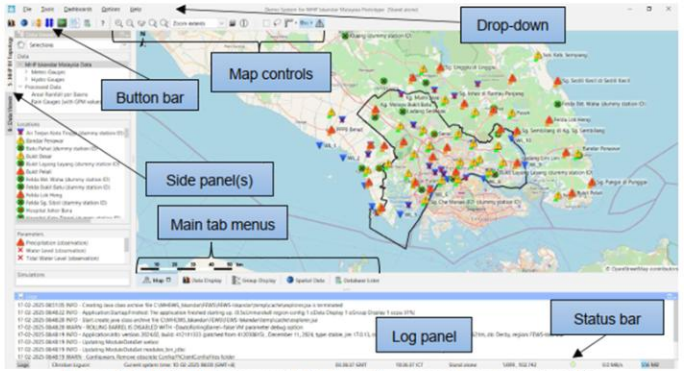


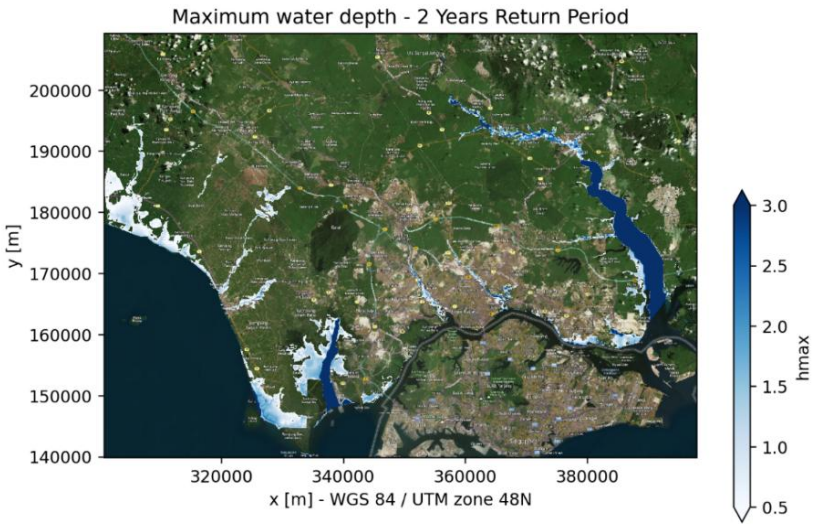
Figure 3.1 MHP-IM Explorer with the Map Display and One Side Panel Open

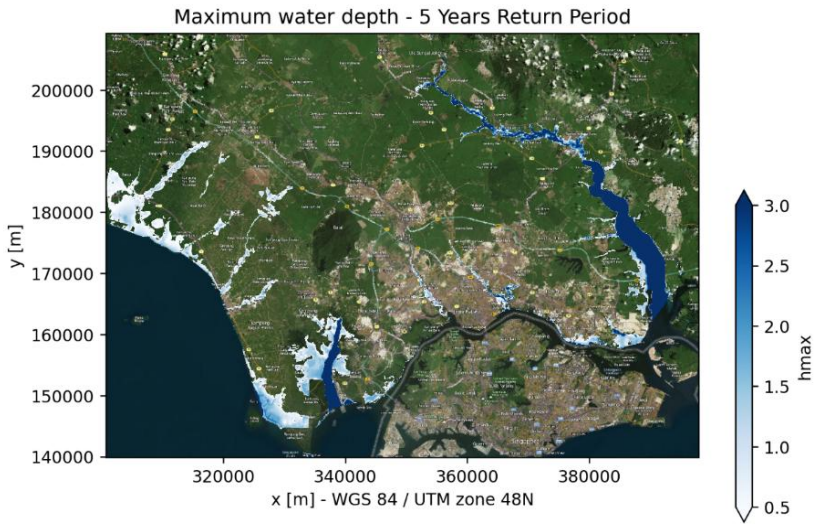
The following elements of the Delft-FEWS Explorer are always shown, regardless of which window or tab is currently open: the drop-down menus, button bar, main tab menus, log panel, status bar and any side panels. These are described in more detail in the subsequent paragraphs.

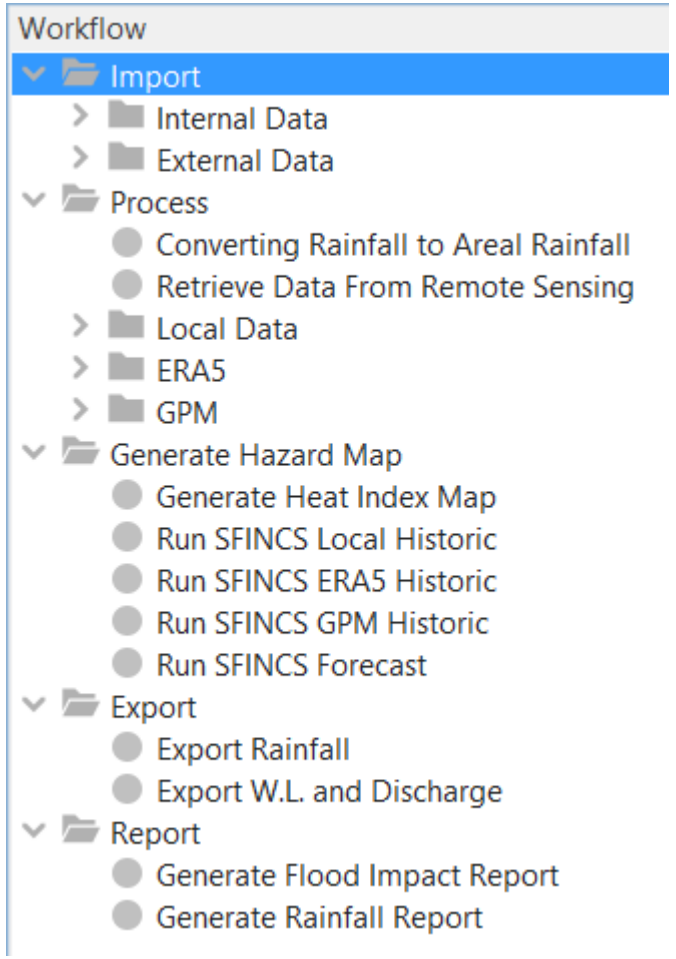
The user can resize, hide or open panels like the Logs or Data Viewer (one of the side panels) by pressing the panel buttons. It is also possible to make any of the tab menus floating and to put them on an additional screen (**Figure 3.2**). The current layout can be saved through the menu File – Save Layout. It is always possible to go back to the default layout from the same menu.

Latest Improvements of the MHP-IM (1)

1. The MHP-IM prototype is functioning properly
2. All collected data have been used to develop the hydrological and hydrodynamic models, and to generate the flood risk map
3. Initial flood model calibration has been completed
4. Flood maps have been produced for multiple return periods

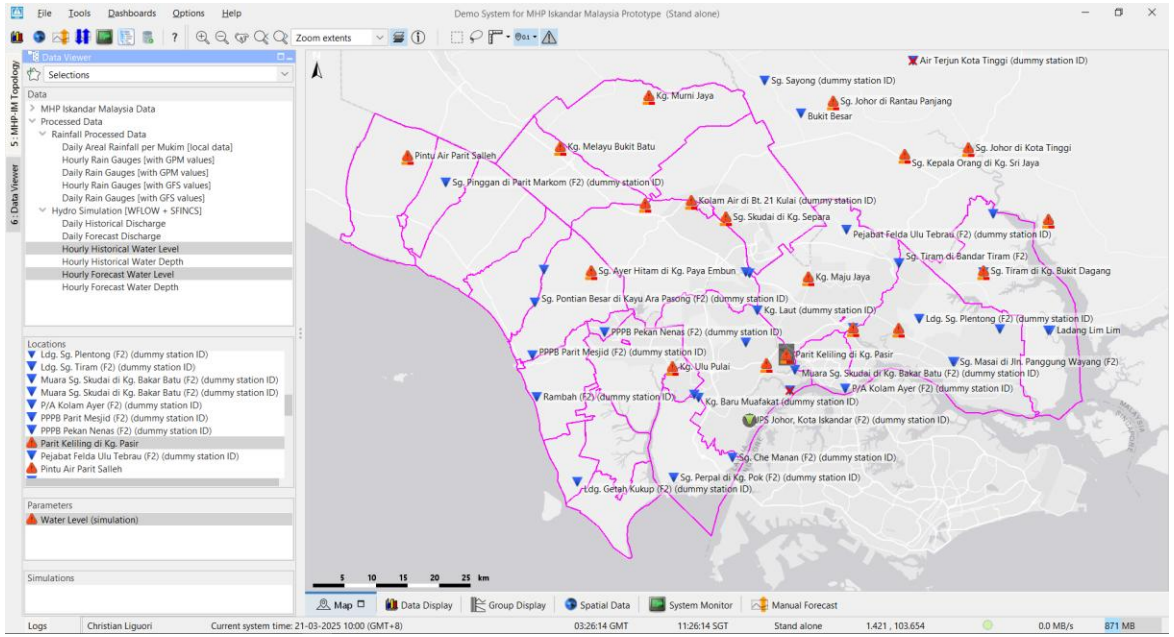


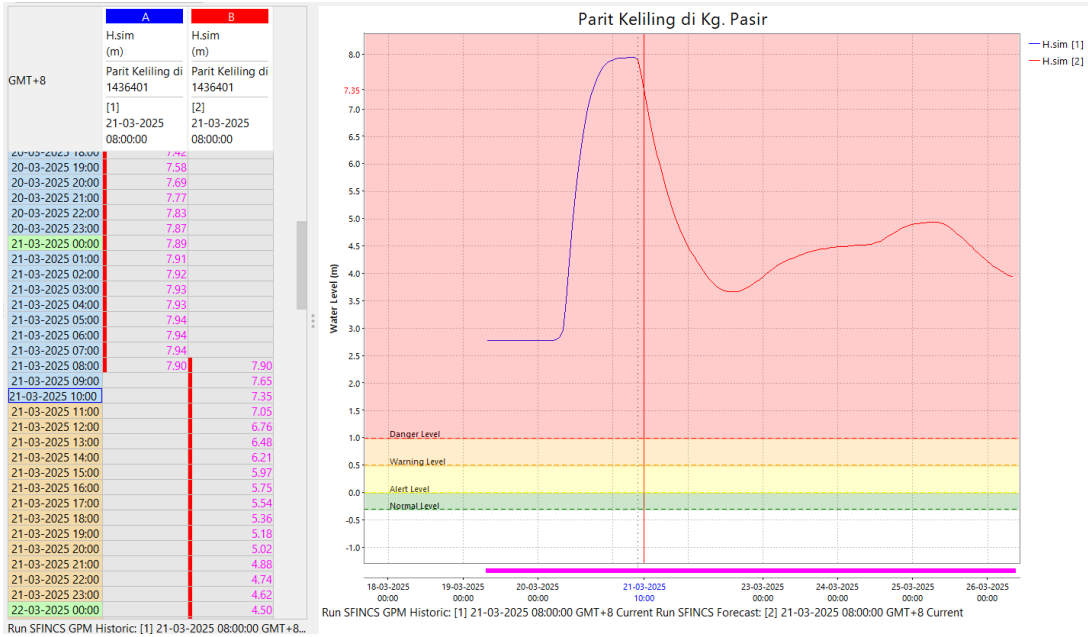




Latest Improvements of the MHP-IM (2)

5. Produce flood early warning at river gauge location based on the water level, water depth and river discharge threshold.





Latest Improvements of the MHP-IM (3)

6. Produce rainfall warning report at the mukim level in Iskandar Malaysia.

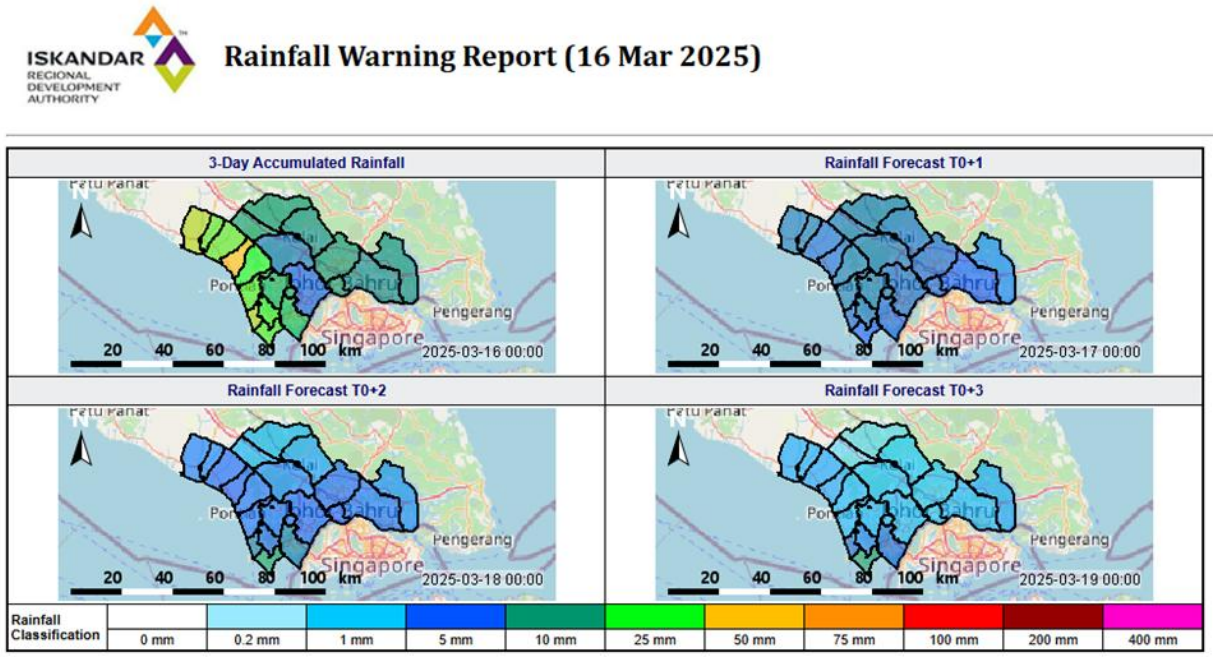


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 16 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	51.1	6.3	5.1	2.4
AYER BALOI	32.3	6.4	4.6	2.5
AYER MASIN	40.5	6.1	7.9	6.3
BANDAR BENUT	41.6	7.7	3.4	2.1
BANDAR JOHOR BAHRU	10.2	6.1	4.7	1.2
BANDAR KULAI	7.9	7.4	1.8	0.7
BANDAR PONTIAN KECHIL	51.8	7.5	4.3	1.8
BANDAR TEBRAU	11.2	6.1	4.7	1.2
BENUT	41.7	7.3	3.9	2.3
BUKIT BATU	11.0	7.4	1.8	0.7
JELUTONG	11.5	7.5	4.3	1.8
JERAM BATU	14.2	7.5	4.3	1.8
KULAI	7.4	7.3	3.4	1.3
PEKAN JERAM BATU	6.3	7.5	4.3	1.8
PENGKALAN RAJA	19.2	7.5	4.3	1.8
PLENTONG	8.9	4.8	4.1	1.7
PONTIAN	25.3	7.5	4.3	1.8
PULAI	5.8	6.7	4.5	1.5
RIMBA TERJUN	30.1	7.5	4.3	1.8
SEDENAK	9.8	7.4	1.8	0.7
SENAI	9.2	6.8	2.5	1.0
SERKAT	29.6	4.8	11.2	10.5
SUNGAI KARANG	27.7	7.0	5.7	3.6
SUNGAI PINGGAN	32.2	7.5	3.7	2.2
SUNGAI TIRAM	9.2	3.4	3.2	2.3
TANJONG KUPANG	15.6	6.1	7.9	6.2
TEBRAU	9.8	6.2	4.4	1.2

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Latest Improvements of the MHP-IM (4)

7. Produce flood warning and impact report at the mukim level in Iskandar Malaysia.

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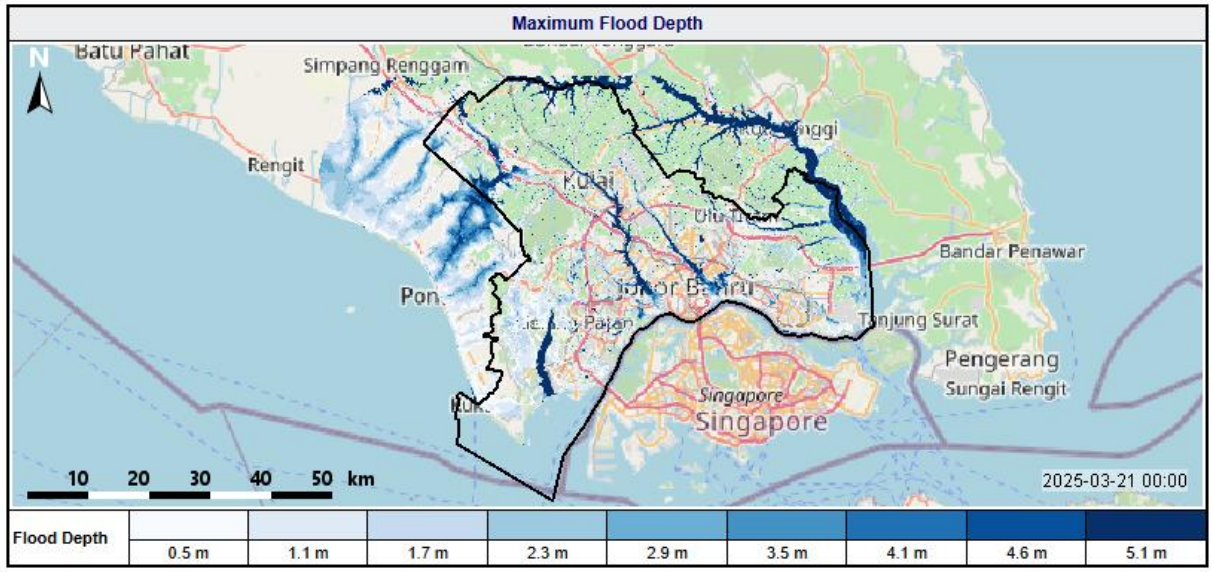
Flood Warning Report (21 Mar 2025)



Note:

1. The percentage of flooded area per mukim is calculated by dividing the inundated area (= 0.5 m depth) by the total area of the mukim.
2. The total affected population in the Number of Population Affected column is rounded to the nearest 5 people.
3. The estimated damage to buildings is rounded to the nearest 1,000 MYR.

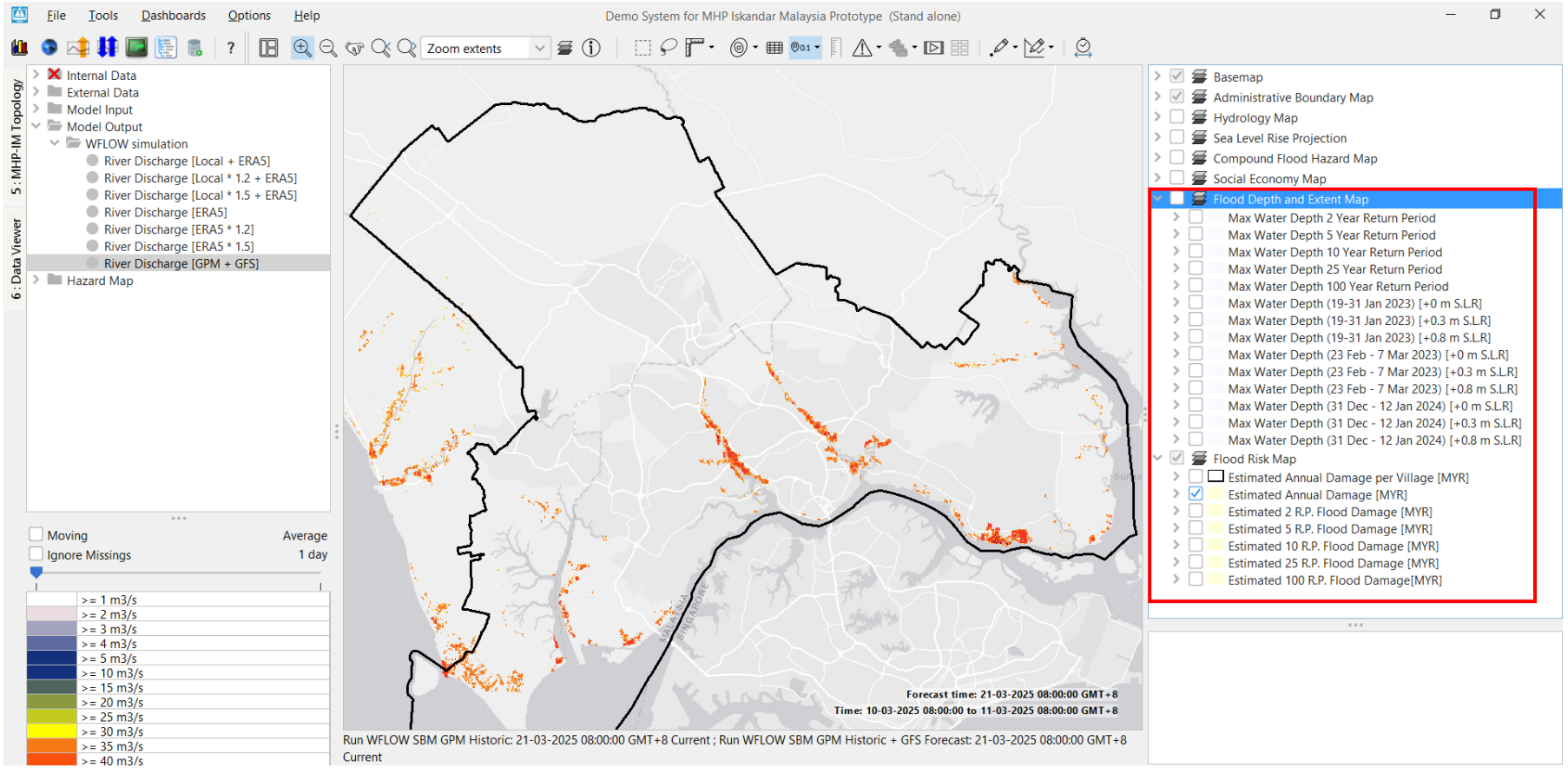
Table of Flood Early Warning Impact per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 21 Mar 2025

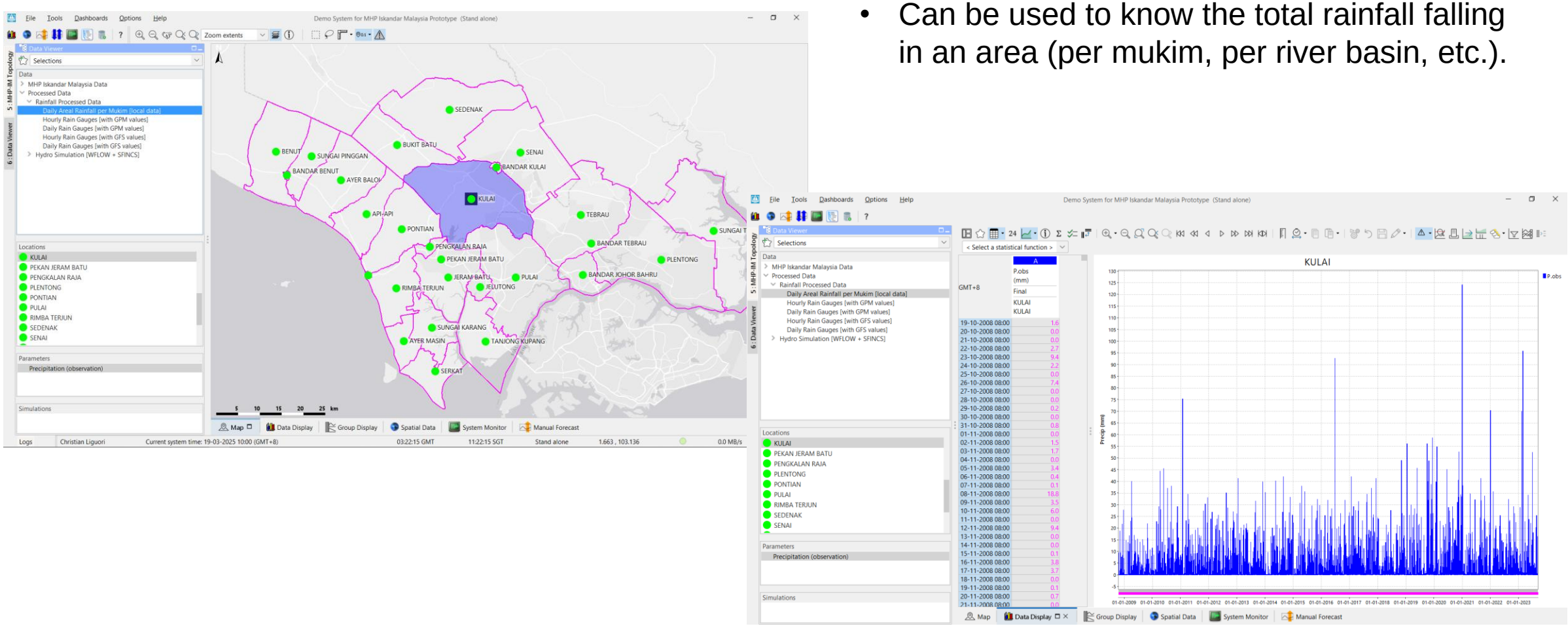
Mukim	Flooded Area [%]	Number of Population Affected [People]	Estimated Damage to Buildings [10^3 MYR]
API-API	79.6	13,170	1,764,278
AYER BALOI	69.3	10,075	954,773
AYER MASIN	45.6	2,630	62,670
BANDAR BENUT	100.0	4,060	320,921
BANDAR JOHOR BAHRU	14.1	14,805	1,142,602
BANDAR KULAI	39.9	3,210	247,335
BANDAR PONTIAN KECHIL	89.7	2,035	378,046
BANDAR TEBRAU	94.5	115	11,788
BENUT	84.6	9,745	808,576
BUKIT BATU	49.0	5,010	974,119
JELUTONG	48.3	5,575	218,429
JERAM BATU	52.2	14,640	1,550,556
KULAI	20.3	38,920	2,208,953
PEKAN JERAM BATU	0.0	0	0
PENGKALAN RAJA	55.5	680	31,035
PLENTONG	21.5	102,010	7,261,783
PONTIAN	74.6	32,990	2,197,954
PULAI	24.7	108,930	7,956,520
RIMBA TERJUN	64.6	24,835	2,983,769
SEDENAK	22.9	4,875	419,589
SENAI	19.1	21,915	6,583,963
SERKAT	42.9	4,465	450,193
SUNGAI KARANG	45.4	670	35,084
SUNGAI PINGGAN	80.8	7,560	672,249
SUNGAI TIRAM	37.5	3,650	462,269
TANJONG KUPANG	40.1	11,370	783,457
TEBRAU	18.9	70,130	7,050,391

Latest Improvements of the MHP-IM (5)

8. Produce flood risk information, i.e. estimated annual damage caused by flooding and estimated flood for several return periods

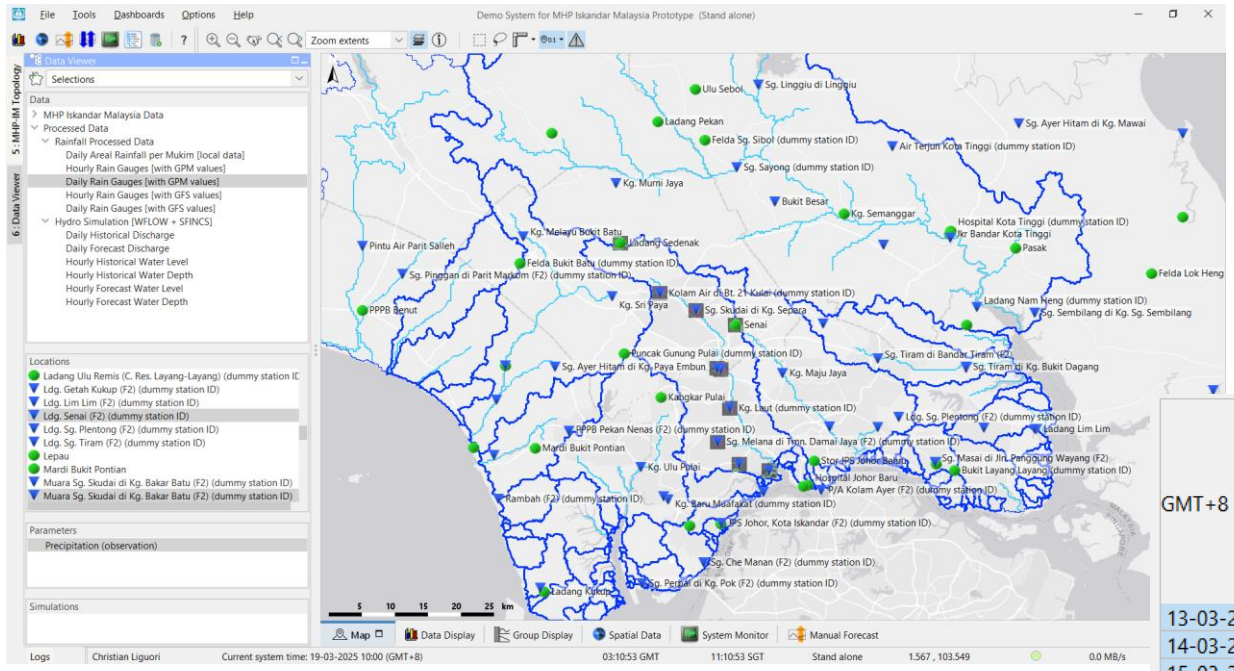


Additional Features: Areal Rainfall Product (based on local gauges)



- Can be used to know the total rainfall falling in an area (per mukim, per river basin, etc.).

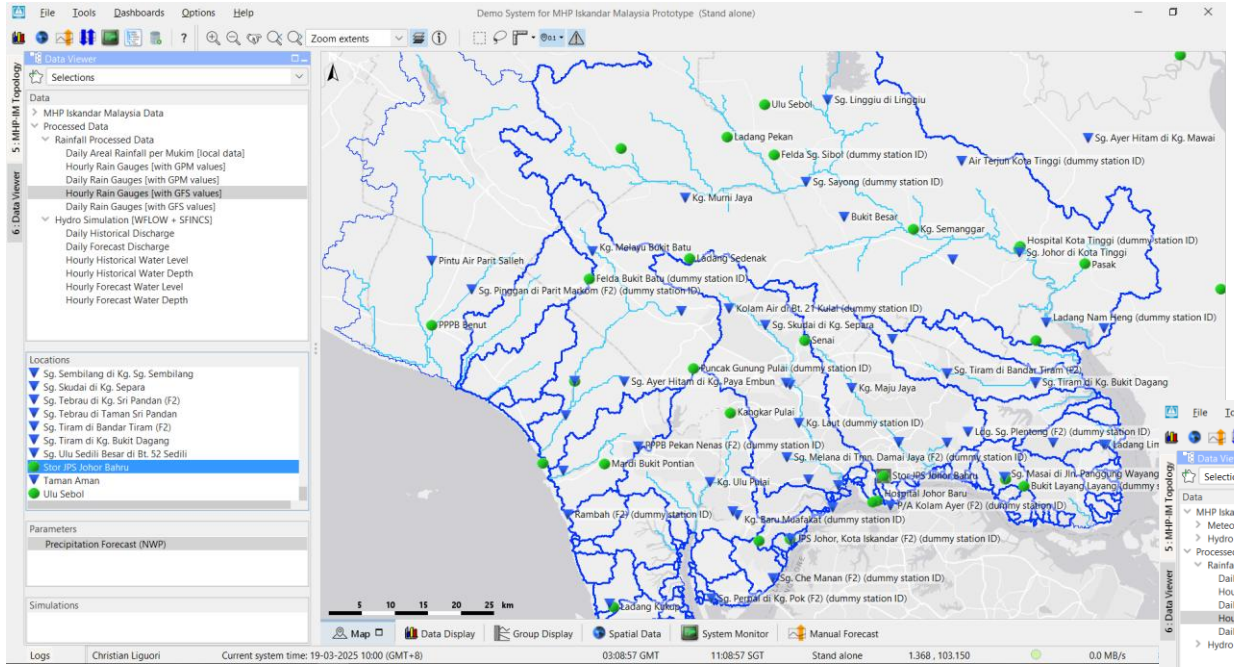
Additional Features: Storing Gridded Rainfall Data at Rain Gauge Locations



- Can be used to know how much rainfall falling per hour/day specifically at the rain gauge locations.
- Can also be used to adjust the global rainfall data.

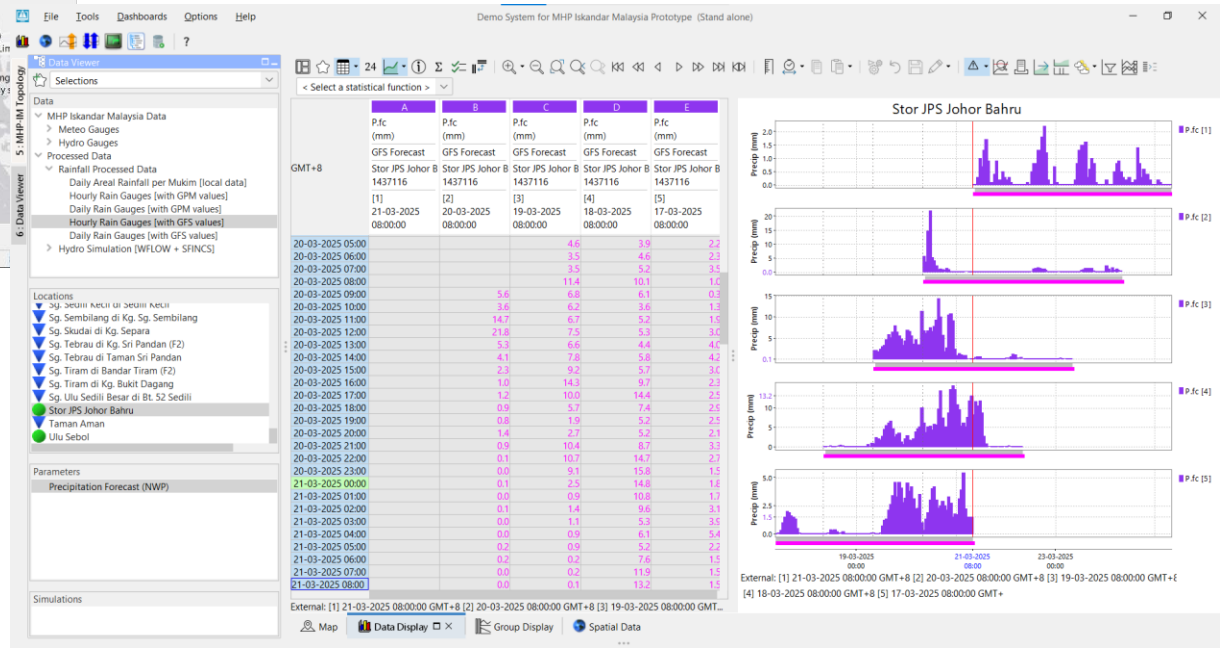
GMT+8	A	B	C	D	E	F	G	H	I	J
	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)	P.obs (mm)
	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early	GPM Early
	Kg. Laut (c	Kolam Air	Kolam Air	Ladang Se	Ldg. Senai	Muara Sg.	Senai	Sg. Melan	Sg. Skudai	Taman An
	1000005	1000020	7239550	1734003	1000022	1000012	0048679	1000018	1636401	1536401
13-03-2025 08:00	2.2	2.5	0.6	2.8	2.2	2.3	1.8	2.2	1.8	2.2
14-03-2025 08:00	2.6	4.0	1.6	9.4	2.6	4.5	5.7	2.6	5.7	2.6
15-03-2025 08:00	2.0	2.7	1.4	1.1	2.0	4.8	2.5	2.0	2.5	2.0
16-03-2025 08:00	0.4	0.6	1.2	0.2	0.4	0.7	0.2	0.4	0.2	0.4
17-03-2025 08:00	0.5	0.2	1.2	0.1	0.5	1.1	0.1	0.5	0.1	0.5
18-03-2025 08:00	3.1	4.8	3.7	5.2	3.1	3.1	3.1	3.1	3.1	3.1
19-03-2025 08:00	3.0	1.7	2.8	1.1	3.0	3.5	1.0	3.0	1.0	3.0
20-03-2025 08:00	109.8	102.5	114.7	91.5	109.8	116.9	103.7	109.8	103.7	109.8
21-03-2025 08:00	112.9	111.2	116.2	118.4	112.9	118.4	109.7	112.9	109.7	112.9

Additional Features: Viewing Changes in Rainfall Forecasts

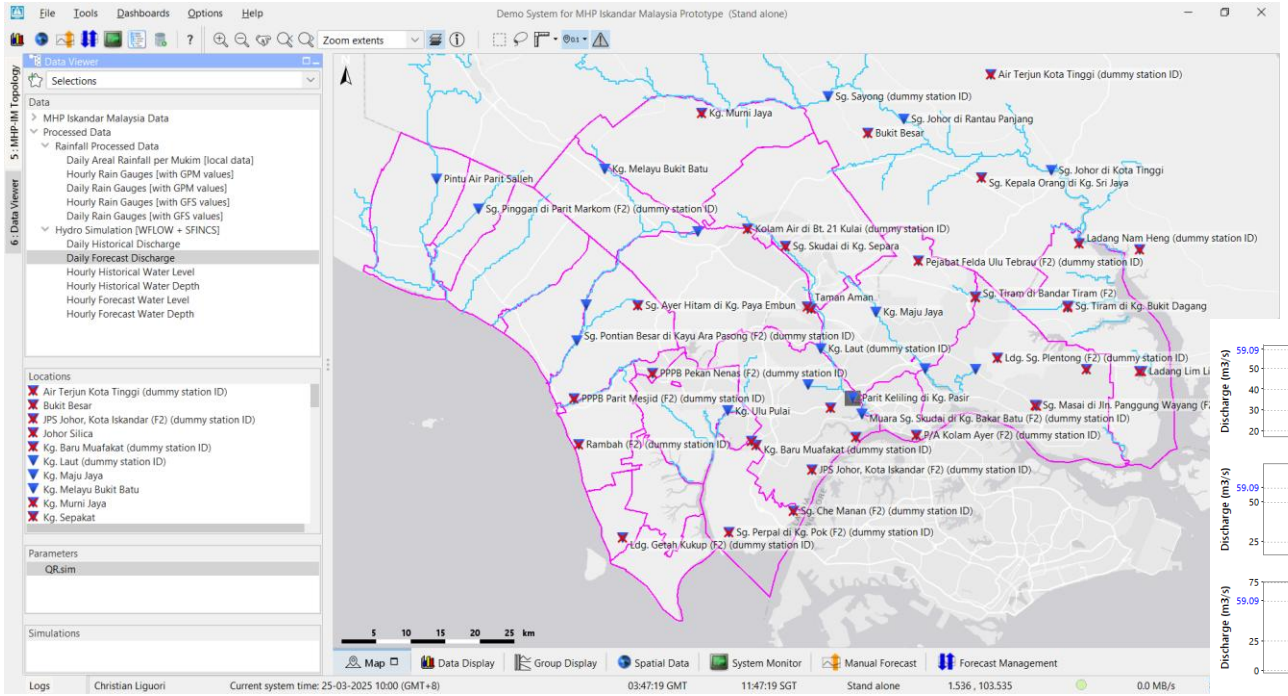


- Can be used to better understand the changes of rainfall forecast from time to time at rain gauge location.

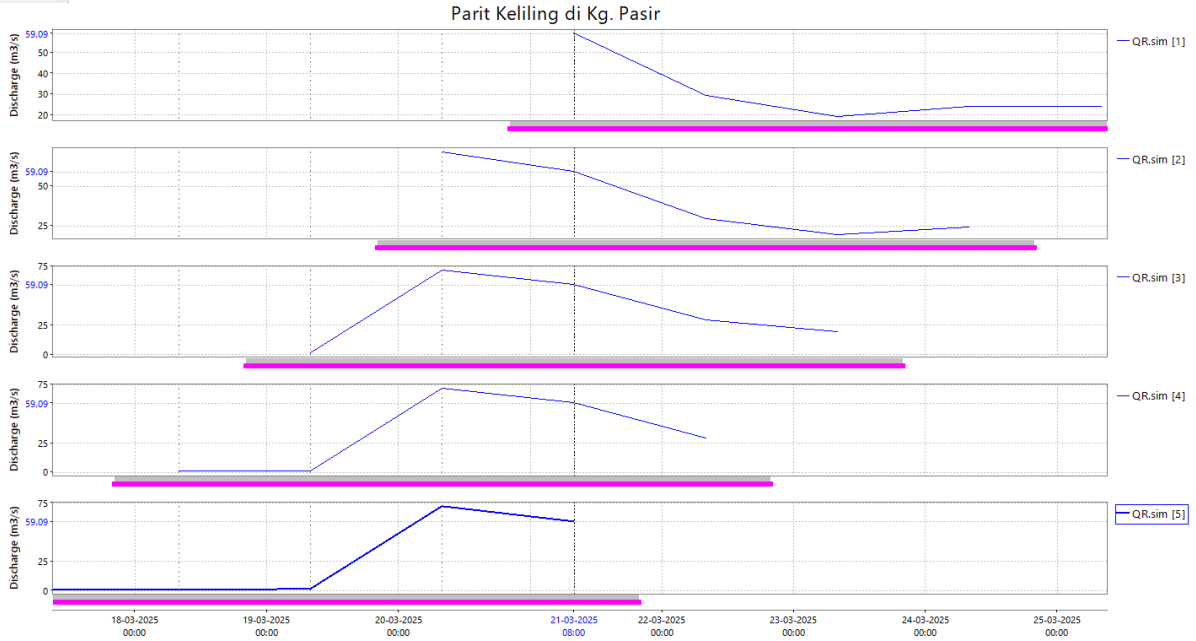
Forecast dynamics



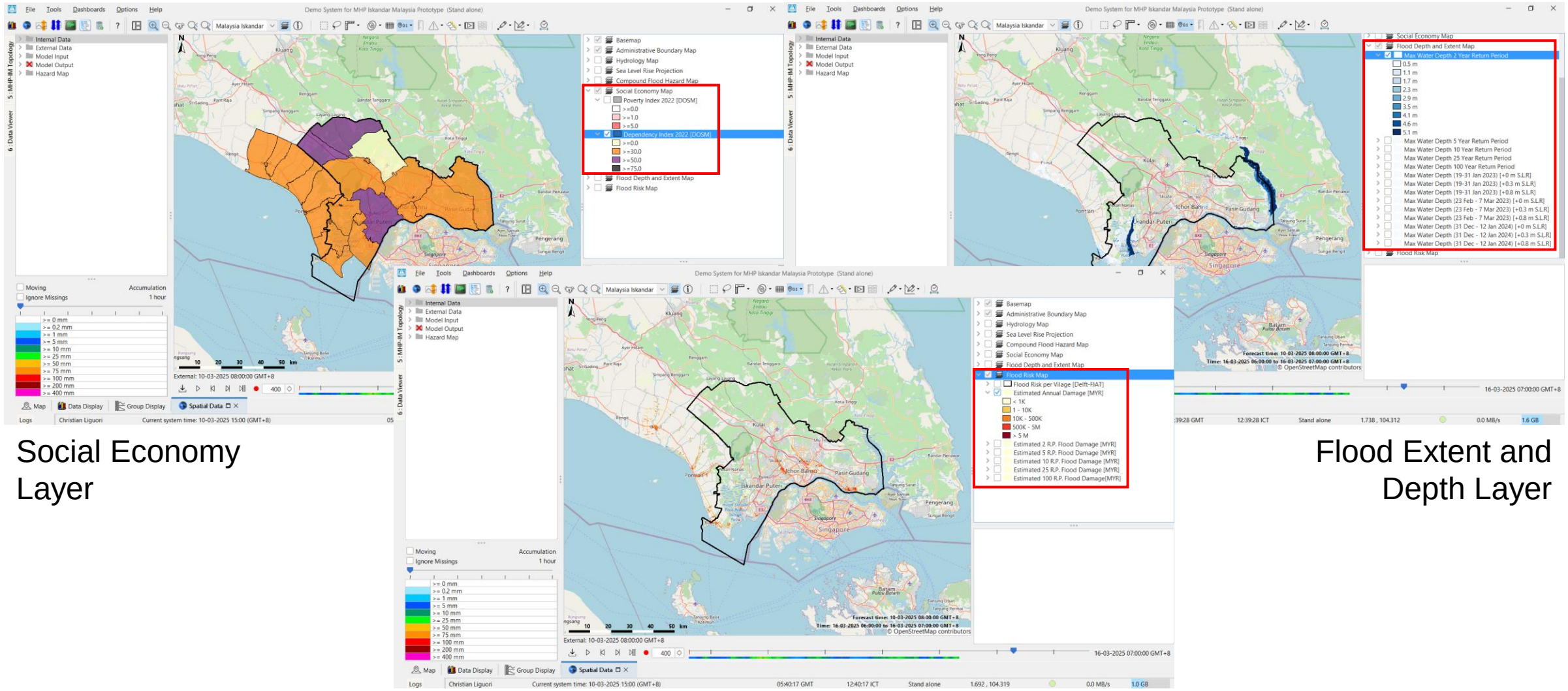
Additional Features: Viewing Changes in Flow Discharge Forecasts



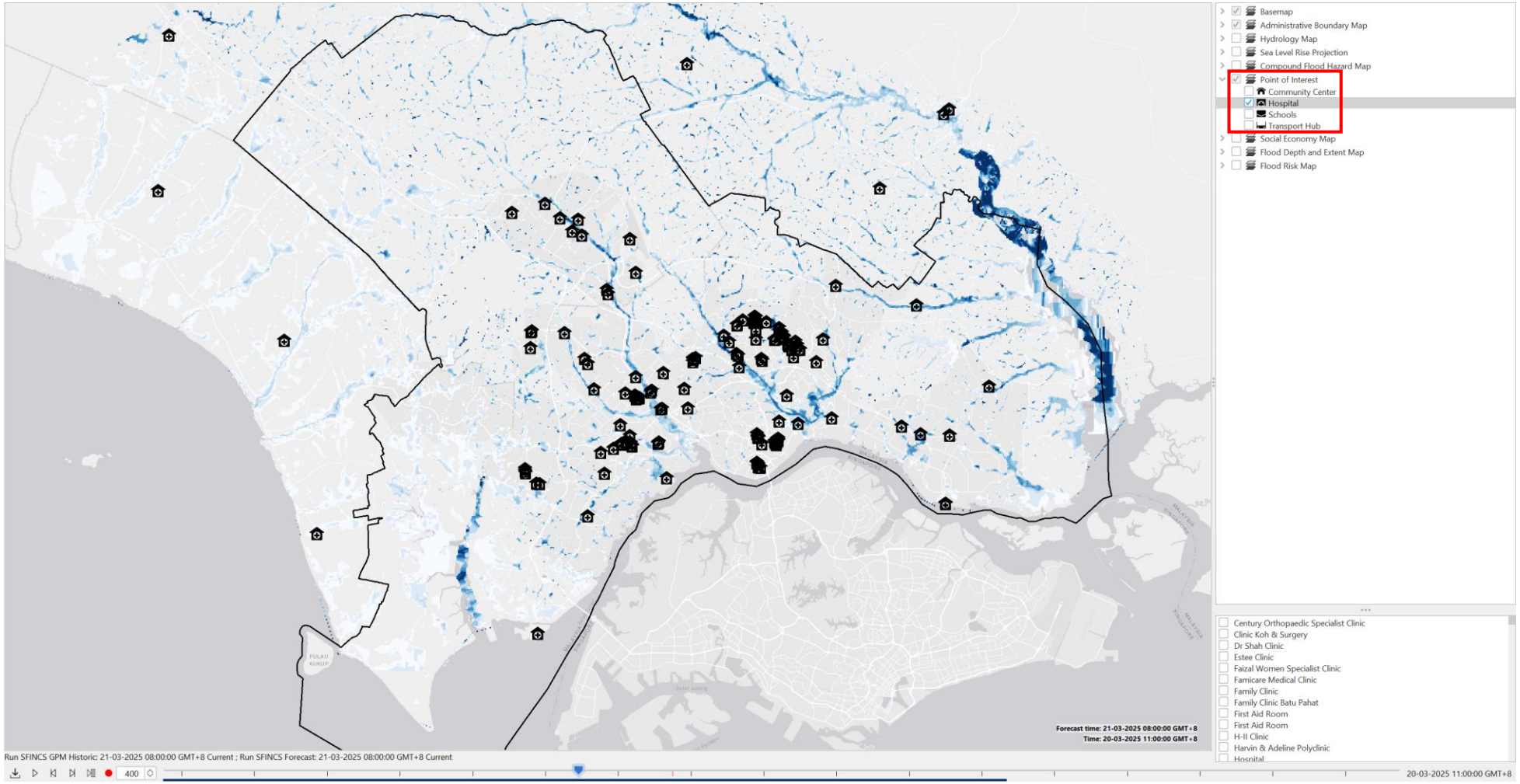
- Can be used to better understand the changes of flow discharge forecast from time to time at river gauge location.



Map Layers inside MHP-IM (1)



Map Layers inside MHP-IM (2)

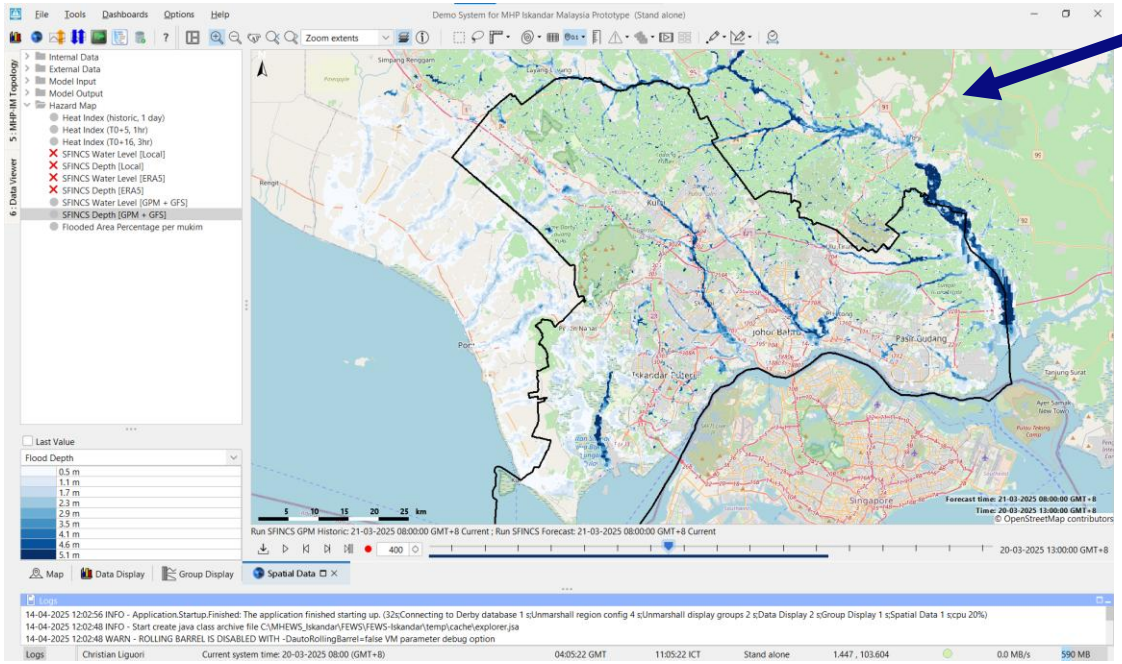


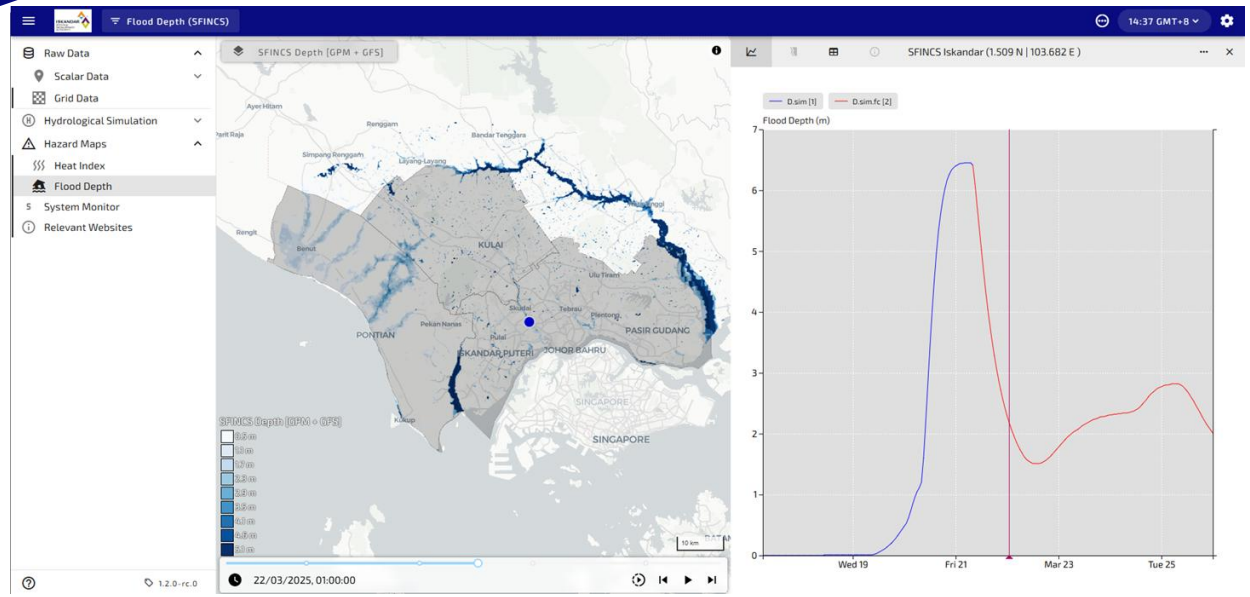
Point of Interest (PoI)

MHP-IM Interfaces

1. MHP-IM Stand Alone Application (for operator)
2. MPH-IM Web OC (for public)

One database





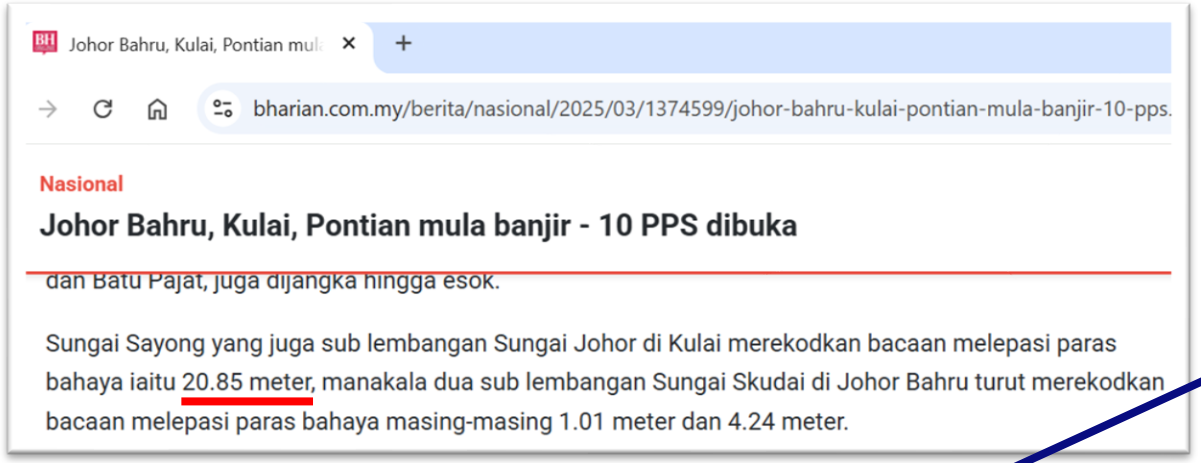
MHP-IM SA

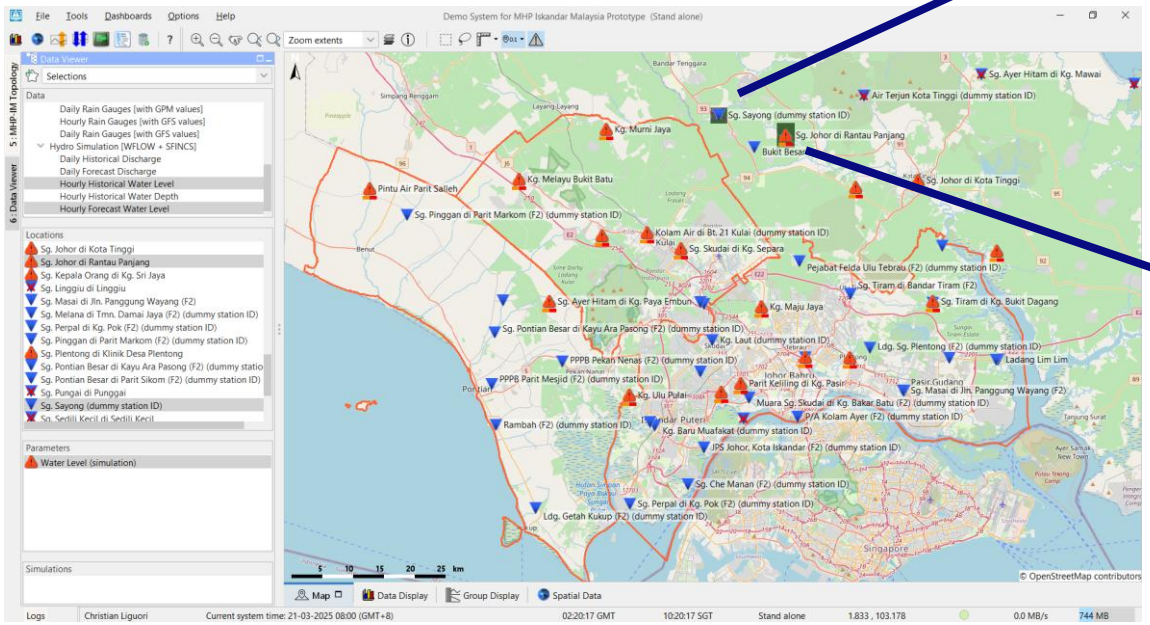
WebOC

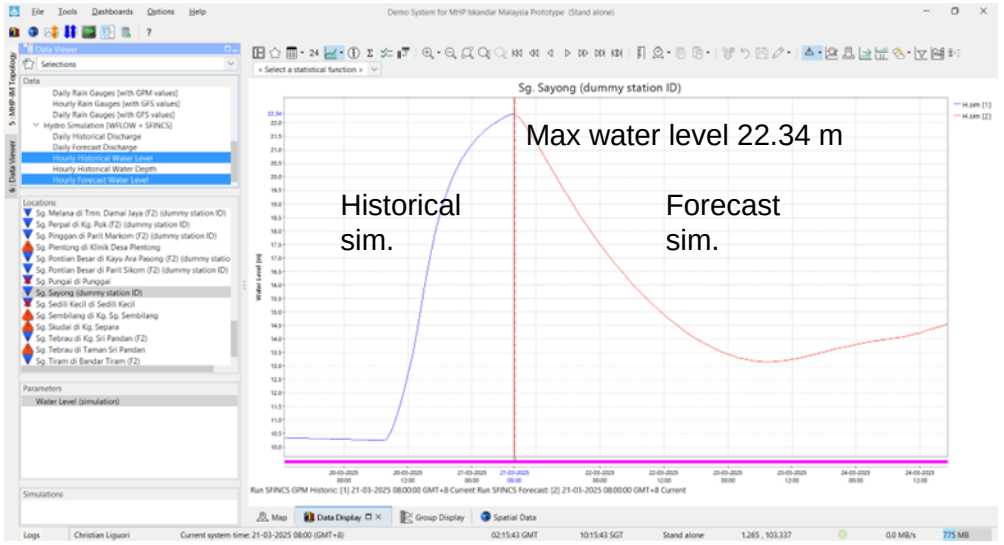
MHP-IM Prototype Use Cases

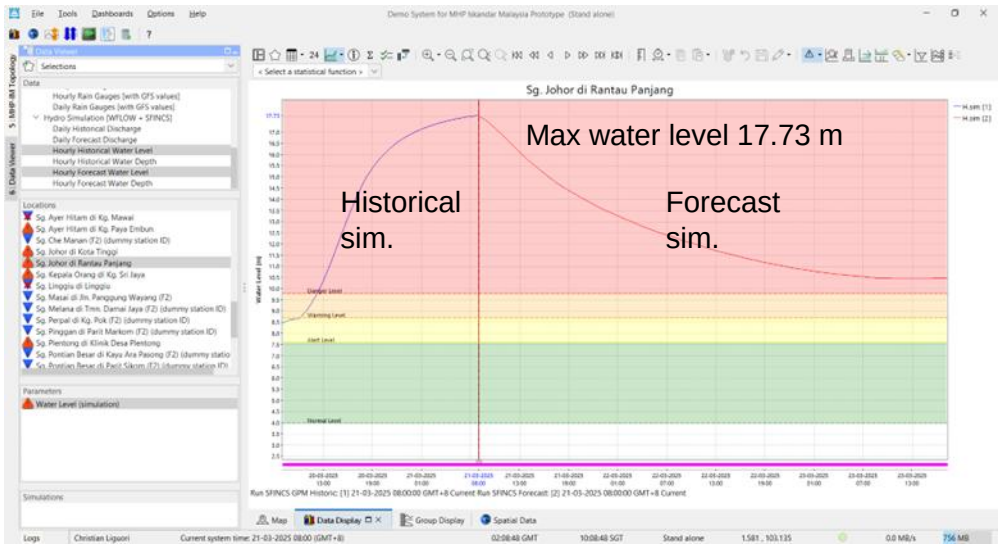
Example Monsoon Surge March, 2025

Flood Event at Sungai Sayong









Rainfall Report 16 Mar 2025

- 16th March: 3-day forecast shows no significant rainfall

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Rainfall Warning Report (16 Mar 2025)

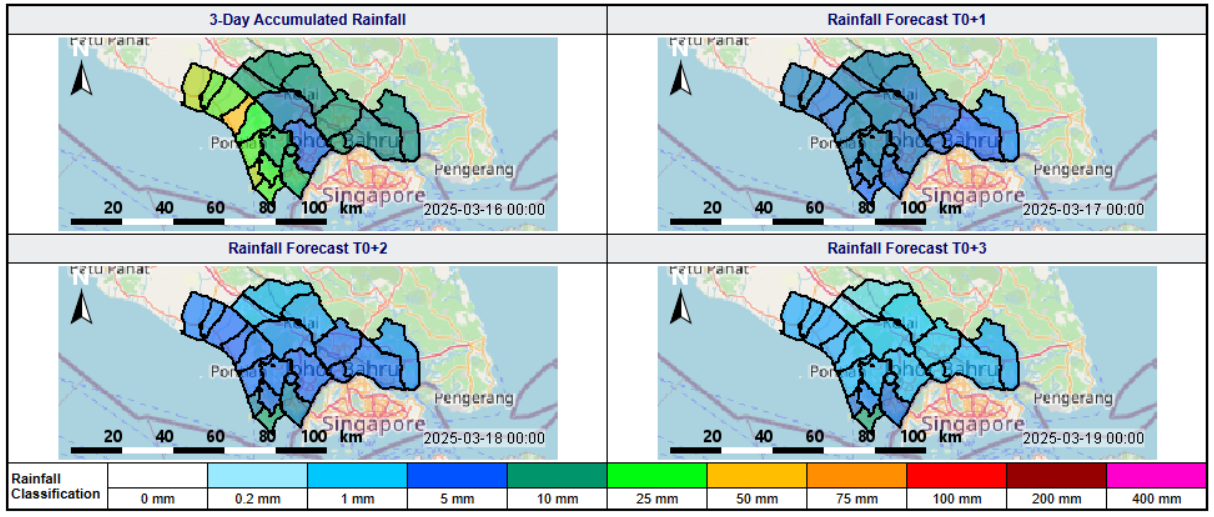


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 16 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	51.1	6.3	5.1	2.4
AYER BALOI	32.3	6.4	4.6	2.5
AYER MASIN	40.5	6.1	7.9	6.3
BANDAR BENUT	41.6	7.7	3.4	2.1
BANDAR JOHOR BAHRU	10.2	6.1	4.7	1.2
BANDAR KULAI	7.9	7.4	1.8	0.7
BANDAR PONTIAN KECHIL	51.8	7.5	4.3	1.8
BANDAR TEBRAU	11.2	6.1	4.7	1.2
BENUT	41.7	7.3	3.9	2.3
BUKIT BATU	11.0	7.4	1.8	0.7
JELUTONG	11.5	7.5	4.3	1.8
JERAM BATU	14.2	7.5	4.3	1.8
KULAI	7.4	7.3	3.4	1.3
PEKAN JERAM BATU	6.3	7.5	4.3	1.8
PENGKALAN RAJA	19.2	7.5	4.3	1.8
PLENTONG	8.9	4.8	4.1	1.7
PONTIAN	25.3	7.5	4.3	1.8
PULAI	5.8	6.7	4.5	1.5
RIMBA TERJUN	30.1	7.5	4.3	1.8
SEDENAK	9.8	7.4	1.8	0.7
SENAI	9.2	6.8	2.5	1.0
SERKAT	29.6	4.8	11.2	10.5
SUNGAI KARANG	27.7	7.0	5.7	3.6
SUNGAI PINGGAN	32.2	7.5	3.7	2.2
SUNGAI TIRAM	9.2	3.4	3.2	2.3
TANJONG KUPANG	15.6	6.1	7.9	6.2
TEBRAU	9.8	6.2	4.4	1.2

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Rainfall Report 17 Mar 2025

- 17th March: First sign of significant rainfall in rainfall forecast, but not very extreme yet

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Rainfall Warning Report (17 Mar 2025)

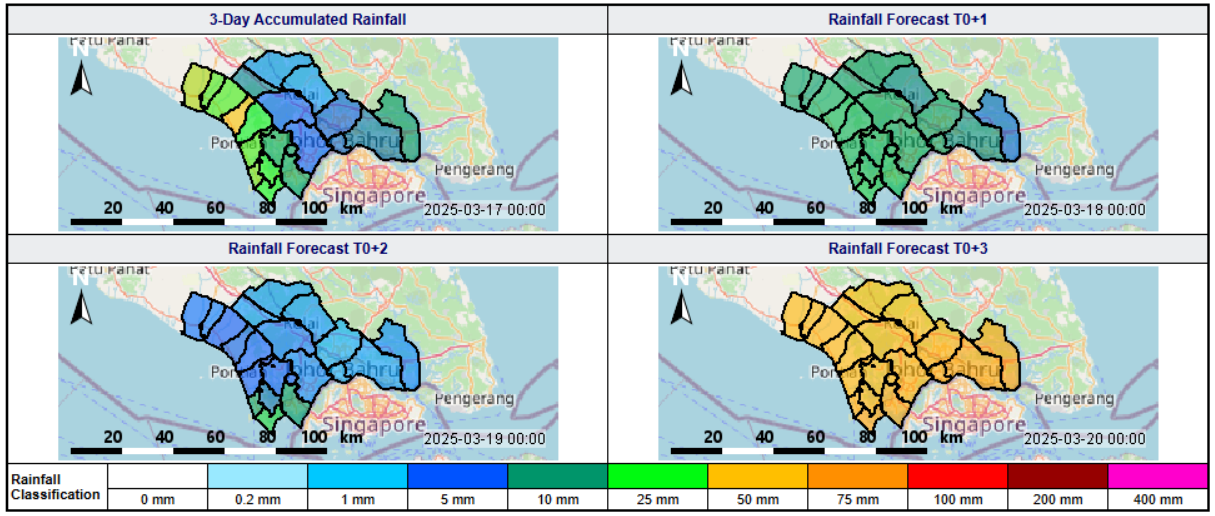


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 17 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	49.2	15.0	5.8	56.1
AYER BALOI	30.8	13.2	5.2	56.1
AYER MASIN	34.9	15.5	11.5	60.8
BANDAR BENUT	41.0	10.6	3.5	54.5
BANDAR JOHOR BAHRU	6.8	11.8	1.9	58.7
BANDAR KULAI	3.1	11.1	2.7	51.6
BANDAR PONTIAN KECHIL	51.5	14.2	4.7	54.4
BANDAR TEBRAU	7.7	11.8	1.9	58.7
BENUT	41.5	11.4	4.1	55.2
BUKIT BATU	8.6	11.1	2.7	51.7
JELUTONG	11.7	14.2	4.7	54.4
JERAM BATU	13.9	14.2	4.7	54.4
KULAI	4.4	12.8	3.7	53.9
PEKAN JERAM BATU	4.4	14.2	4.7	54.4
PENGKALAN RAJA	17.7	14.2	4.7	54.4
PLENTONG	8.0	9.5	2.4	62.4
PONTIAN	23.8	14.2	4.7	54.4
PULAI	4.5	12.9	3.2	56.7
RIMBA TERJUN	30.6	14.2	4.7	54.4
SEDENAK	2.8	10.9	2.7	51.5
SENAI	2.6	8.9	2.7	51.4
SERKAT	25.3	16.8	17.8	66.7
SUNGAI KARANG	25.7	14.7	7.3	56.9
SUNGAI PINGGAN	31.5	11.0	3.8	54.9
SUNGAI TIRAM	10.3	6.6	3.2	65.0
TANJONG KUPANG	13.5	15.6	11.3	61.0
TEBRAU	6.1	11.1	2.0	57.5

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Flood Warning Report 17 Mar 2025

- 17th March:
  Also, no significant flooding indicated for this period.

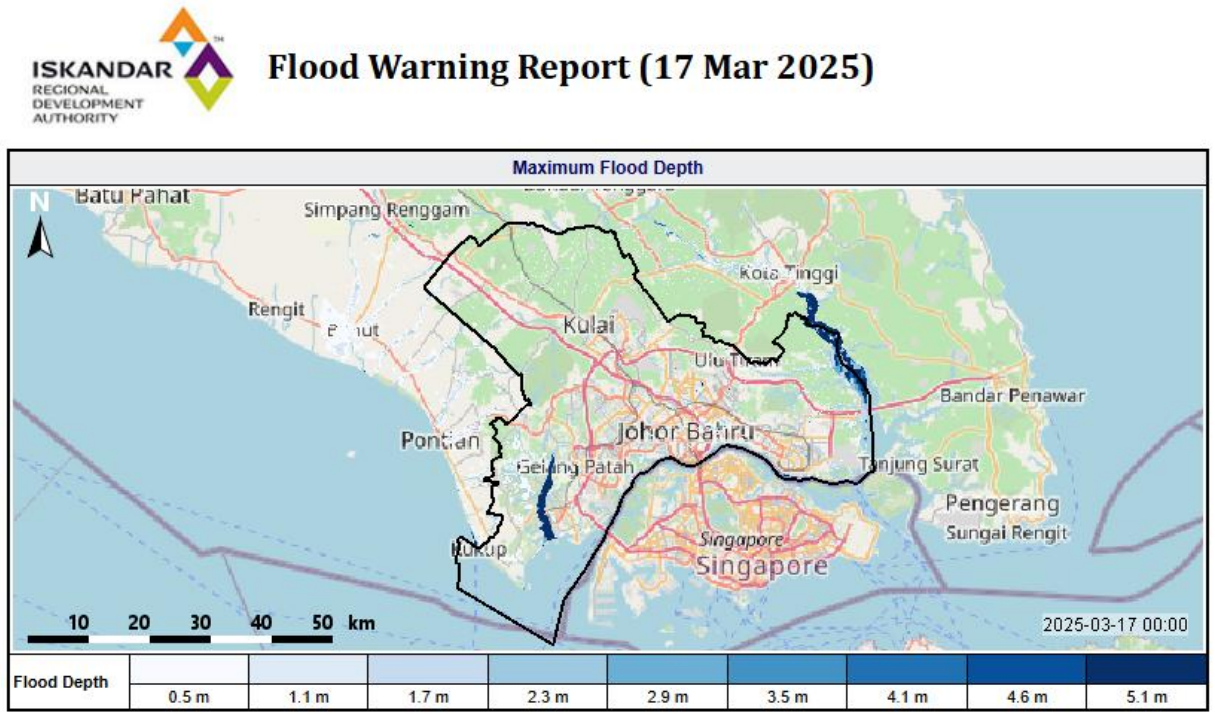


Table of Flood Early Warning Impact per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 17 Mar 2025

Mukim	Flooded Area [%]	Number of Population Affected [People]	Estimated Damage to Buildings [10^3 MYR]
API-API	12.9	2,650	135,594
AYER BALOI	11.3	1,125	23,410
AYER MASIN	8.3	350	2,661
BANDAR BENUT	96.9	3,840	46,044
BANDAR JOHOR BAHRU	3.4	5,745	223,538
BANDAR KULAI	7.6	465	14,256
BANDAR PONTIAN KECHIL	24.1	340	48,604
BANDAR TEBRAU	58.0	35	2,725
BENUT	36.7	3,565	32,834
BUKIT BATU	3.5	105	720
JELUTONG	7.4	1,690	44,113
JERAM BATU	11.6	785	14,768
KULAI	0.7	3,110	62,685
PEKAN JERAM BATU	0.0	0	0
PENGKALAN RAJA	1.6	10	0
PLENTONG	5.4	22,520	1,020,245
PONTIAN	13.0	4,420	235,209
PULAI	1.9	7,655	123,029
RIMBA TERJUN	12.4	6,495	157,434
SEDENAK	3.1	415	9,679
SENAI	3.0	3,820	324,997
SERKAT	13.6	825	306,140
SUNGAI KARANG	19.8	320	105
SUNGAI PINGGAN	16.1	1,145	7,589
SUNGAI TIRAM	19.4	560	117,871
TANJONG KUPANG	17.4	4,485	342,409
TEBRAU	3.3	12,935	876,017

Rainfall Report 18 Mar 2025

- 18th March: Clear sign in the forecast that extreme rainfall is predicted over large areas with lead-time of around 1-2 days

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Rainfall Warning Report (18 Mar 2025)

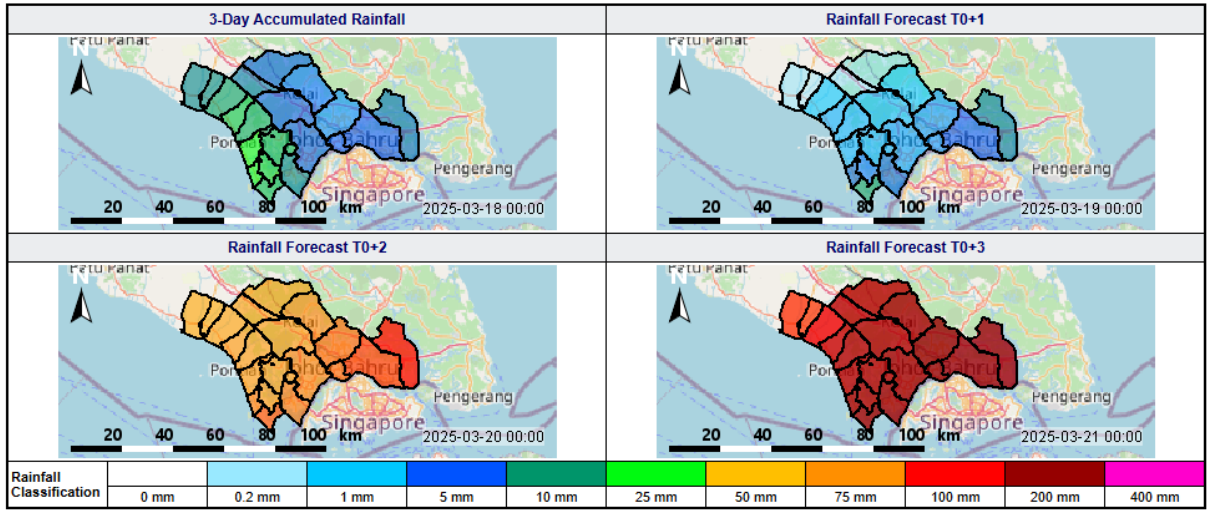


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 18 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	17.1	1.9	72.9	152.3
AYER BALOI	11.5	1.1	68.1	113.9
AYER MASIN	24.4	6.6	79.2	189.0
BANDAR BENUT	10.5	0.1	62.1	89.4
BANDAR JOHOR BAHRU	4.5	2.8	82.1	201.7
BANDAR KULAI	4.3	0.4	69.0	163.9
BANDAR PONTIAN KECHIL	33.5	1.8	72.1	173.2
BANDAR TEBRAU	2.7	2.8	82.1	201.7
BENUT	8.9	0.4	63.7	92.7
BUKIT BATU	7.9	0.4	68.9	162.3
JELUTONG	14.9	1.8	72.1	173.2
JERAM BATU	14.9	1.8	72.1	173.2
KULAI	6.0	1.4	72.2	173.2
PEKAN JERAM BATU	7.3	1.8	72.1	173.2
PENGKALAN RAJA	11.3	1.8	72.1	173.2
PLENTONG	5.5	5.4	89.3	210.1
PONTIAN	13.2	1.8	72.1	173.1
PULAI	6.2	2.3	77.5	188.5
RIMBA TERJUN	25.0	1.8	72.1	173.2
SEDENAK	6.0	0.4	69.5	165.3
SENAI	3.8	1.0	76.8	185.2
SERKAT	15.5	11.0	85.7	203.6
SUNGAI KARANG	19.1	3.7	74.8	179.3
SUNGAI PINGGAN	9.3	0.3	62.9	91.1
SUNGAI TIRAM	7.4	8.2	96.6	213.7
TANJONG KUPANG	9.1	6.6	79.5	190.3
TEBRAU	2.9	2.6	82.0	201.0

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Flood Warning Report 18 Mar 2025

- 18th March: Resulting in substantial flooded areas, estimated number of affected people and damage

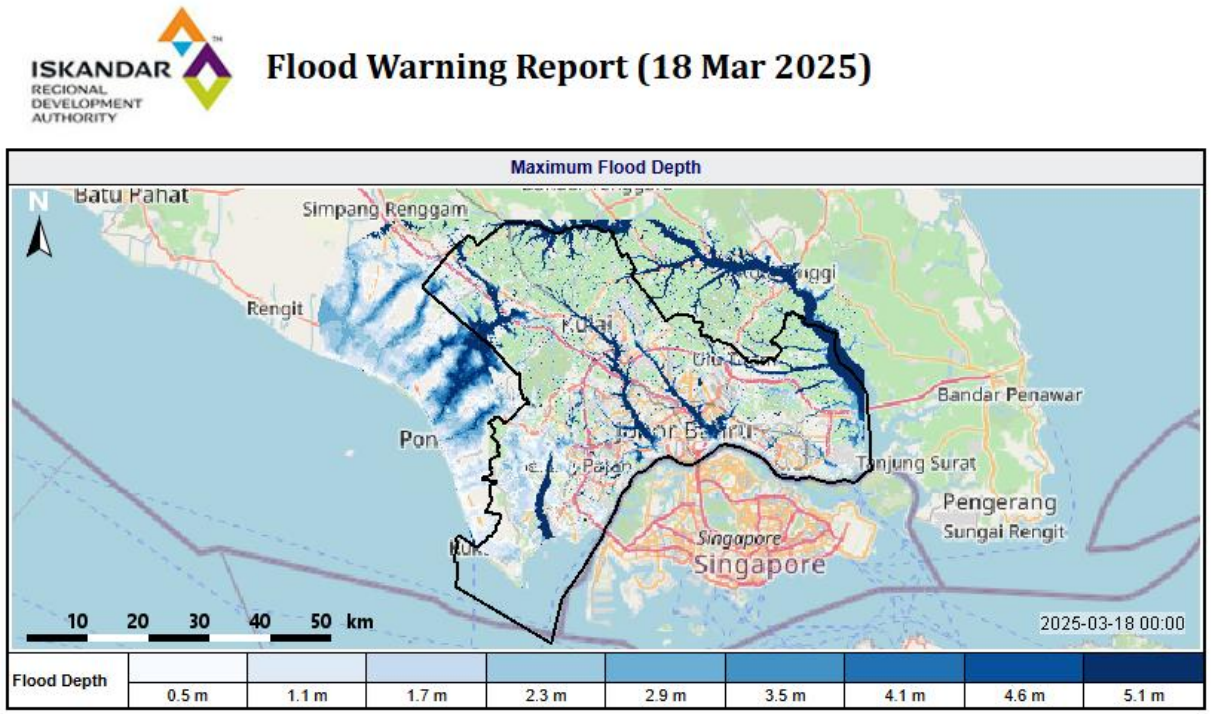


Table of Flood Early Warning Impact per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 18 Mar 2025

Mukim	Flooded Area [%]	Number of Population Affected [People]	Estimated Damage to Buildings [10^3 MYR]
API-API	88.2	13,655	1,872,436
AYER BALOI	80.9	10,480	1,111,848
AYER MASIN	54.9	3,055	197,081
BANDAR BENUT	100.0	4,060	320,921
BANDAR JOHOR BAHRU	17.0	18,935	1,482,768
BANDAR KULAI	46.7	3,835	295,843
BANDAR PONTIAN KECHIL	92.1	2,040	465,678
BANDAR TEBRAU	100.0	125	12,514
BENUT	86.8	9,885	831,565
BUKIT BATU	56.2	6,720	1,352,507
JELUTONG	55.5	6,440	301,003
JERAM BATU	59.4	18,155	2,256,354
KULAI	24.3	50,920	3,184,002
PEKAN JERAM BATU	0.0	0	0
PENGKALAN RAJA	65.4	975	68,921
PLENTONG	25.9	132,370	10,085,375
PONTIAN	84.2	34,985	2,637,748
PULAI	28.4	131,775	10,080,468
RIMBA TERJUN	73.8	26,045	3,360,191
SEDENAK	28.6	8,620	735,550
SENAI	22.9	29,395	8,890,810
SERKAT	48.4	4,870	644,137
SUNGAI KARANG	50.4	735	45,628
SUNGAI PINGGAN	84.3	7,680	689,359
SUNGAI TIRAM	41.7	4,785	601,455
TANJONG KUPANG	45.7	12,995	1,101,799
TEBRAU	22.5	86,010	9,341,065

Rainfall Report 19 Mar 2025

- 19th March: Clear sign in the forecast that extreme rainfall is predicted over large areas with lead-time of around 0-1 days. Total rainfall volume slightly less then in previous forecast.

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Rainfall Warning Report (19 Mar 2025)

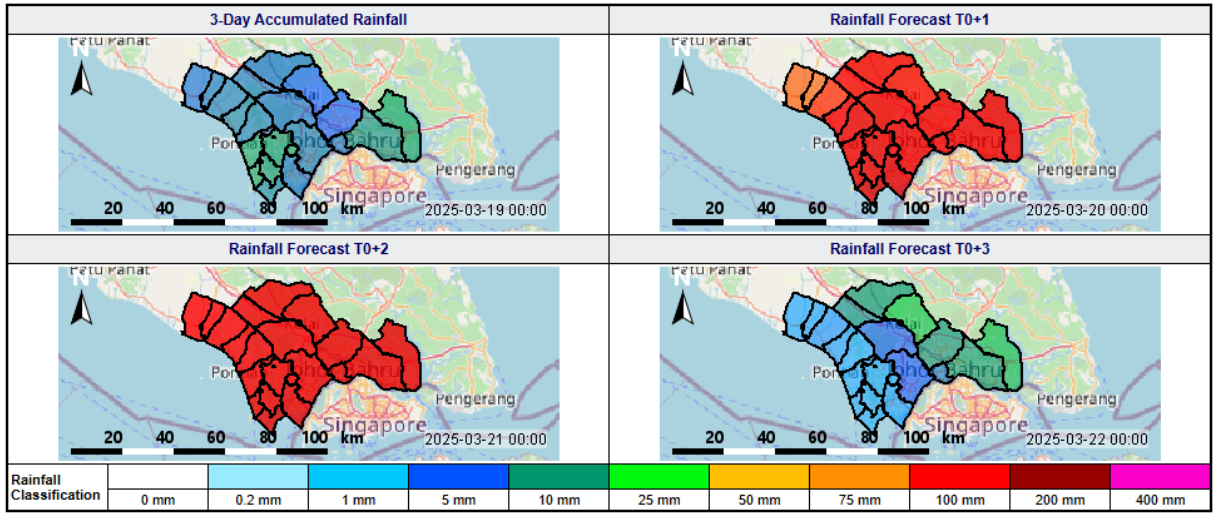


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 19 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	8.1	108.0	112.7	2.7
AYER BALOI	7.5	92.7	106.3	3.1
AYER MASIN	11.9	127.6	124.3	2.3
BANDAR BENUT	7.5	81.9	99.4	2.7
BANDAR JOHOR BAHRU	7.1	115.0	123.8	7.3
BANDAR KULAI	5.2	99.9	111.2	9.1
BANDAR PONTIAN KECHIL	14.5	114.3	113.2	2.3
BANDAR TEBRAU	4.9	115.0	123.8	7.3
BENUT	6.5	84.3	101.0	2.5
BUKIT BATU	7.3	99.5	111.0	9.0
JELUTONG	11.8	114.3	113.2	2.3
JERAM BATU	10.5	114.3	113.2	2.3
KULAI	6.7	109.1	113.7	5.4
PEKAN JERAM BATU	7.3	114.3	113.2	2.3
PENGKALAN RAJA	7.4	114.3	113.2	2.3
PLENTONG	9.4	114.0	120.6	10.6
PONTIAN	7.7	114.2	113.2	2.4
PULAI	7.6	114.7	118.9	5.0
RIMBA TERJUN	11.6	114.3	113.2	2.3
SEDENAK	6.5	99.7	111.4	9.7
SENAI	4.9	97.8	114.5	17.1
SERKAT	8.3	140.0	134.6	2.3
SUNGAI KARANG	10.0	119.5	117.5	2.3
SUNGAI PINGGAN	7.1	83.2	100.2	2.6
SUNGAI TIRAM	11.8	111.3	119.2	15.5
TANJONG KUPANG	7.2	127.4	124.6	2.5
TEBRAU	5.0	112.0	122.6	9.6

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Rainfall Report 20 Mar 2025

- 20th March: Rainfall arrived with high total observed rainfall volumes and still some rain to come

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Rainfall Warning Report (20 Mar 2025)

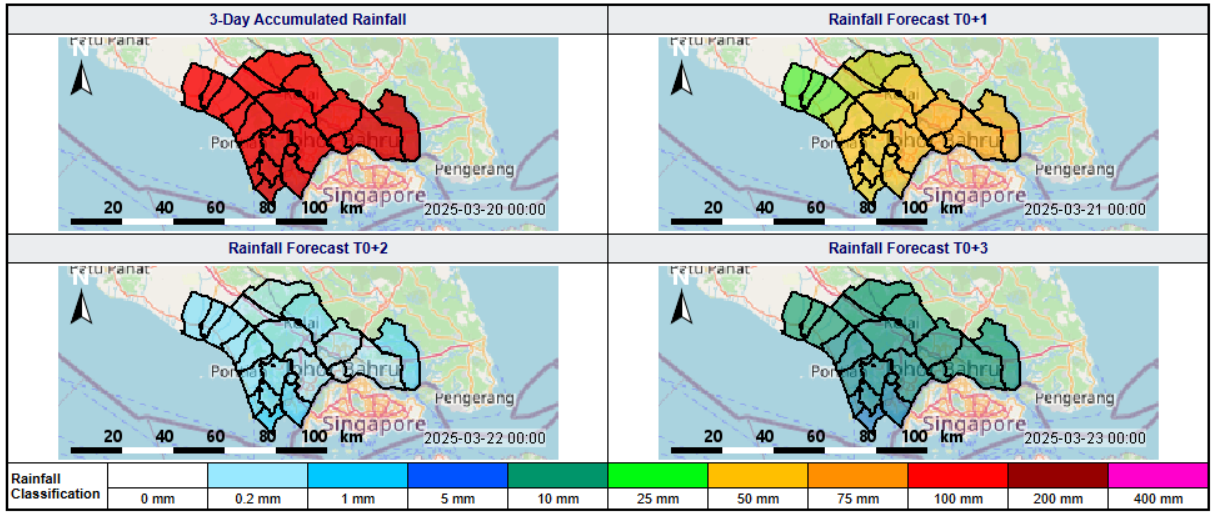


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 20 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	113.8	42.6	0.6	9.0
AYER BALOI	108.6	33.2	0.6	10.1
AYER MASIN	133.6	48.7	0.8	7.9
BANDAR BENUT	107.2	29.8	0.6	11.1
BANDAR JOHOR BAHRU	122.5	64.3	0.3	9.4
BANDAR KULAI	108.3	44.7	0.3	9.7
BANDAR PONTIAN KECHIL	125.5	50.2	0.6	8.8
BANDAR TEBRAU	118.8	64.3	0.3	9.4
BENUT	105.0	29.9	0.6	10.9
BUKIT BATU	107.0	44.4	0.3	9.7
JELUTONG	121.5	50.2	0.6	8.8
JERAM BATU	119.3	50.2	0.6	8.8
KULAI	112.1	49.8	0.5	9.2
PEKAN JERAM BATU	116.0	50.2	0.6	8.8
PENGKALAN RAJA	115.2	50.2	0.6	8.8
PLENTONG	132.6	62.5	0.3	9.7
PONTIAN	114.9	50.1	0.6	8.8
PULAI	120.0	57.8	0.4	9.1
RIMBA TERJUN	118.5	50.2	0.6	8.8
SEDENAK	99.6	45.0	0.3	9.7
SENAI	106.2	50.7	0.6	9.4
SERKAT	140.8	47.3	1.0	7.0
SUNGAI KARANG	127.8	49.6	0.7	8.4
SUNGAI PINGGAN	106.1	29.9	0.6	11.0
SUNGAI TIRAM	139.3	61.4	0.7	9.6
TANJONG KUPANG	131.5	49.3	0.8	8.0
TEBRAU	117.5	62.6	0.4	9.4

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Rainfall Report 21 Mar 2025

- 21st March: Rainfall arrived with high total observed rainfall volumes (up to ~250 mm!)

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Rainfall Warning Report (21 Mar 2025)

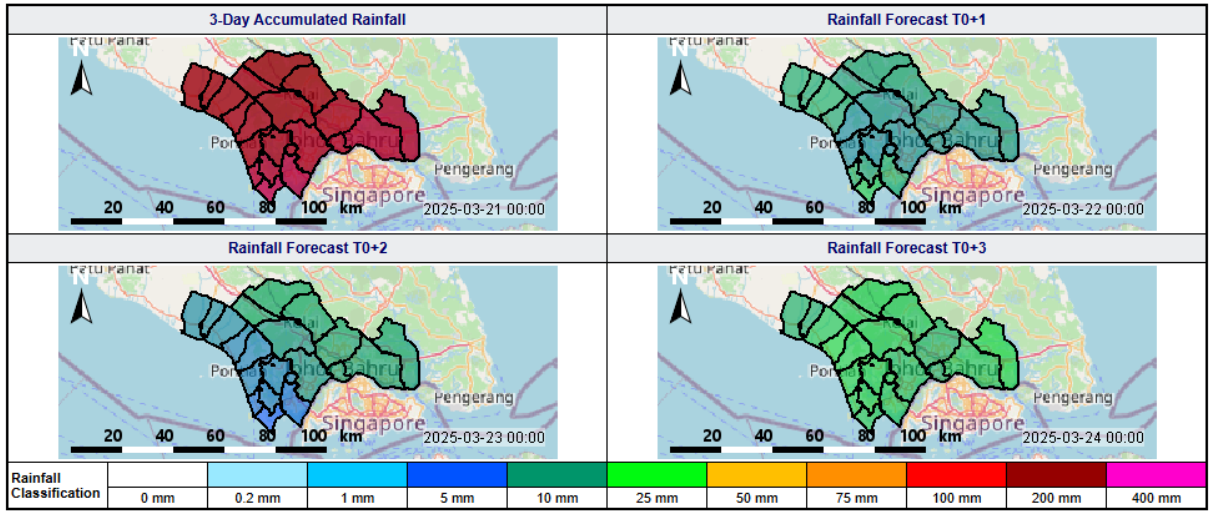


Table of Rainfall per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 21 Mar 2025

Mukim	3-Day Accumulated Rainfall [mm]	Rainfall Forecast T0+1 [mm]	Rainfall Forecast T0+2 [mm]	Rainfall Forecast T0+3 [mm]
API-API	220.6	11.3	7.6	19.2
AYER BALOI	212.8	12.6	8.3	16.3
AYER MASIN	254.2	12.6	6.2	16.7
BANDAR BENUT	213.3	11.4	8.7	11.5
BANDAR JOHOR BAHRU	237.0	9.2	11.0	12.6
BANDAR KULAI	214.8	9.8	11.6	17.1
BANDAR PONTIAN KECHIL	232.9	8.5	7.5	17.6
BANDAR TEBRAU	230.0	9.2	11.0	12.6
BENUT	213.7	11.9	8.4	12.8
BUKIT BATU	220.1	9.8	11.5	17.0
JELUTONG	230.5	8.5	7.5	17.6
JERAM BATU	226.4	8.5	7.5	17.6
KULAI	218.6	9.0	9.4	16.9
PEKAN JERAM BATU	220.6	8.5	7.5	17.6
PENGKALAN RAJA	221.5	8.5	7.5	17.6
PLENTONG	246.1	9.2	11.0	16.0
PONTIAN	221.6	8.5	7.5	17.6
PULAI	231.3	8.9	9.4	14.9
RIMBA TERJUN	223.4	8.5	7.5	17.6
SEDENAK	216.3	9.8	11.6	17.0
SENAI	214.3	9.8	11.3	16.1
SERKAT	273.5	16.4	5.0	15.8
SUNGAI KARANG	247.8	10.1	7.0	17.2
SUNGAI PINGGAN	213.8	11.7	8.5	12.2
SUNGAI TIRAM	243.7	9.7	10.8	19.0
TANJONG KUPANG	259.1	12.6	6.4	16.5
TEBRAU	226.8	9.3	11.0	13.1

Note:

Rainfall Classification		
	Light	< 41 mm
	Moderate	41 - 60.9 mm
	Heavy	61 - 80.4 mm
	Very Heavy	> 80.5 mm

Flood Warning Report 21 Mar 2025

- 21st March: With substantial (simulated) flooded area as a result

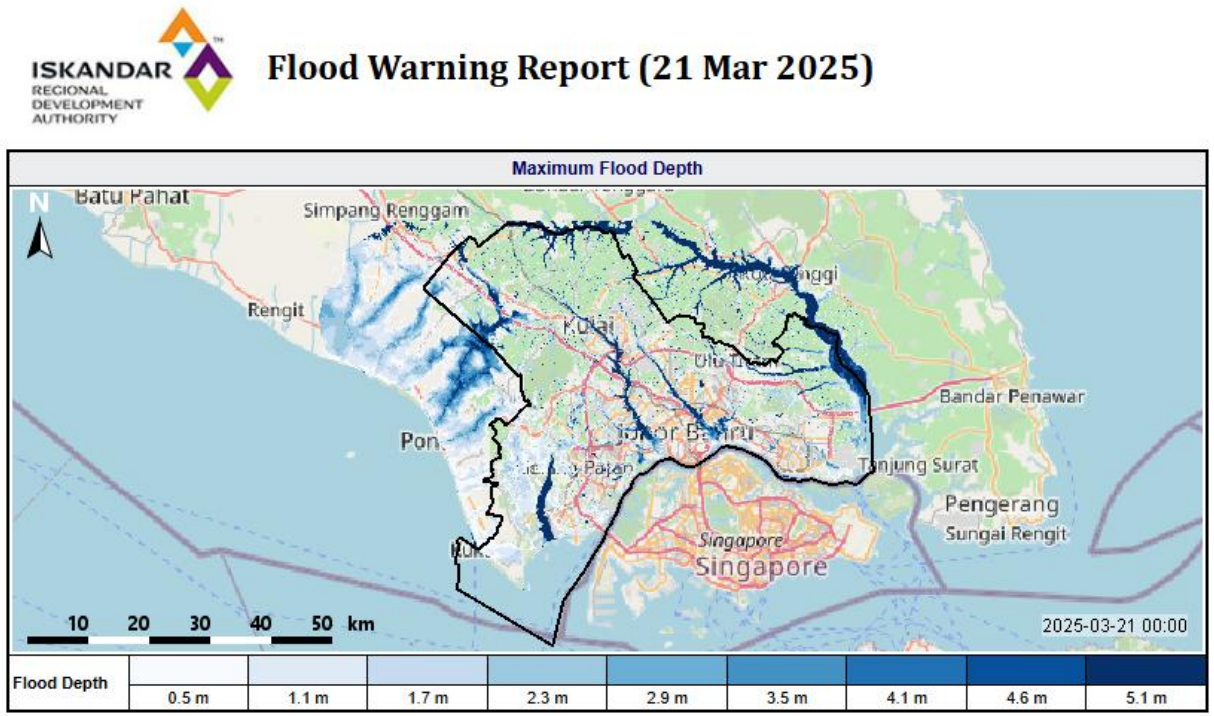


Table of Flood Early Warning Impact per Mukim for the Iskandar Malaysia Region

Based on forecast with T0 = 21 Mar 2025

Mukim	Flooded Area [%]	Number of Population Affected [People]	Estimated Damage to Buildings [10^3 MYR]
API-API	79.6	13,170	1,764,278
AYER BALOI	69.3	10,075	954,773
AYER MASIN	45.6	2,630	62,670
BANDAR BENUT	100.0	4,060	320,921
BANDAR JOHOR BAHRU	14.1	14,805	1,142,602
BANDAR KULAI	39.9	3,210	247,335
BANDAR PONTIAN KECHIL	89.7	2,035	378,046
BANDAR TEBRAU	94.5	115	11,788
BENUT	84.6	9,745	808,576
BUKIT BATU	49.0	5,010	974,119
JELUTONG	48.3	5,575	218,429
JERAM BATU	52.2	14,640	1,550,556
KULAI	20.3	38,920	2,208,953
PEKAN JERAM BATU	0.0	0	0
PENGKALAN RAJA	55.5	680	31,035
PLENTONG	21.5	102,010	7,261,783
PONTIAN	74.6	32,990	2,197,954
PULAI	24.7	108,930	7,956,520
RIMBA TERJUN	64.6	24,835	2,983,769
SEDENAK	22.9	4,875	419,589
SENAI	19.1	21,915	6,583,963
SERKAT	42.9	4,465	450,193
SUNGAI KARANG	45.4	670	35,084
SUNGAI PINGGAN	80.8	7,560	672,249
SUNGAI TIRAM	37.5	3,650	462,269
TANJONG KUPANG	40.1	11,370	783,457
TEBRAU	18.9	70,130	7,050,391

Monsoon Surge, March 2025

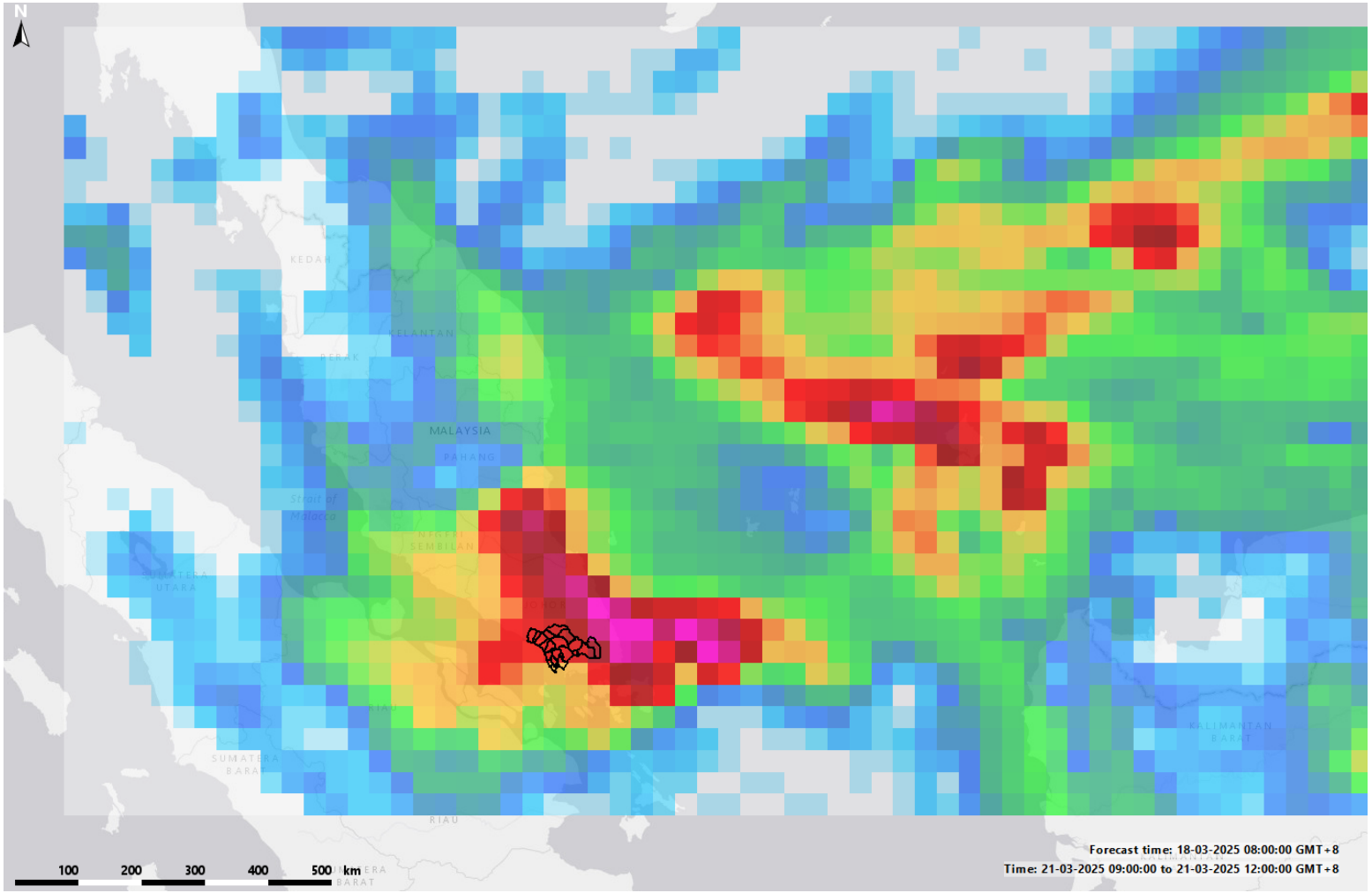
Remarks:

- Forecasts based on global data only (GFS forecast)
- No detailed validation was done, this demo purely demonstrates the possibilities of the MHP

Recommendations:

- Test with MET-Malaysia data as input.
- Validate flood maps using feedback from field reports.

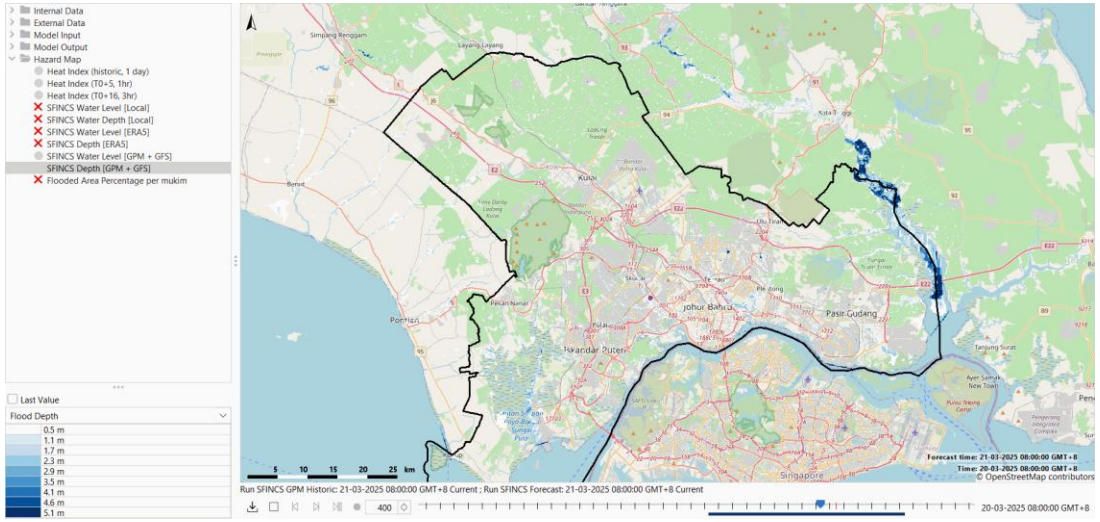
GFS forecast of 18-03-2025



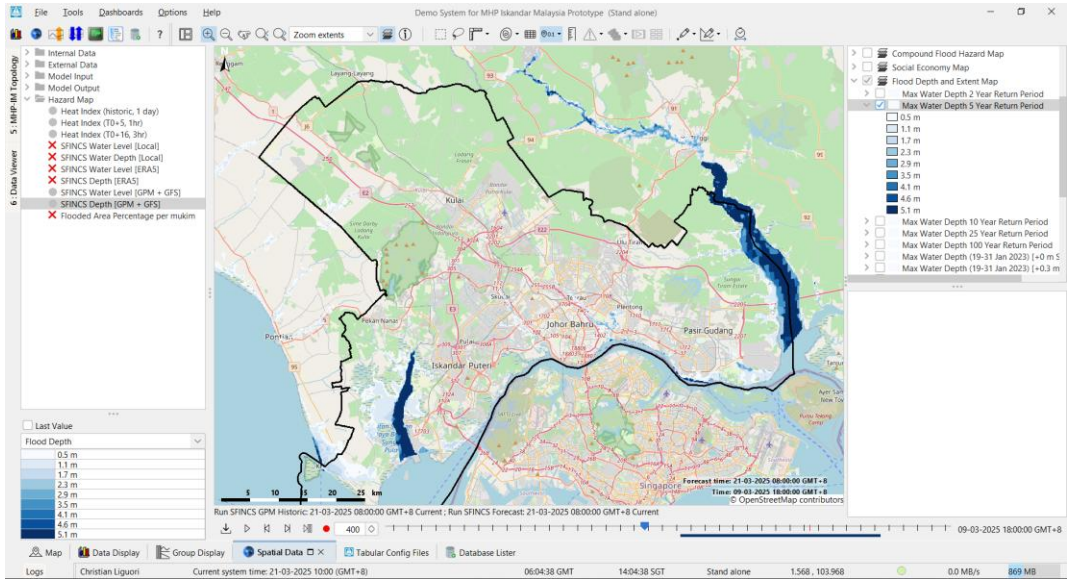
MHP-IM Prototype Live Demonstration

Added Value of MHP-IM (1)

1. **Integrated Situational Awareness**
2. **Model-Based Flood Hazard Information**
3. **Forecasting Capability (river discharge + flood estimate)**
4. **User-Centric Interface Design**
5. **Flood Impact Estimation** (flooded area, number of people affected and number of estimated damage)
6. **Provide flood risk map and other relevant map layers**

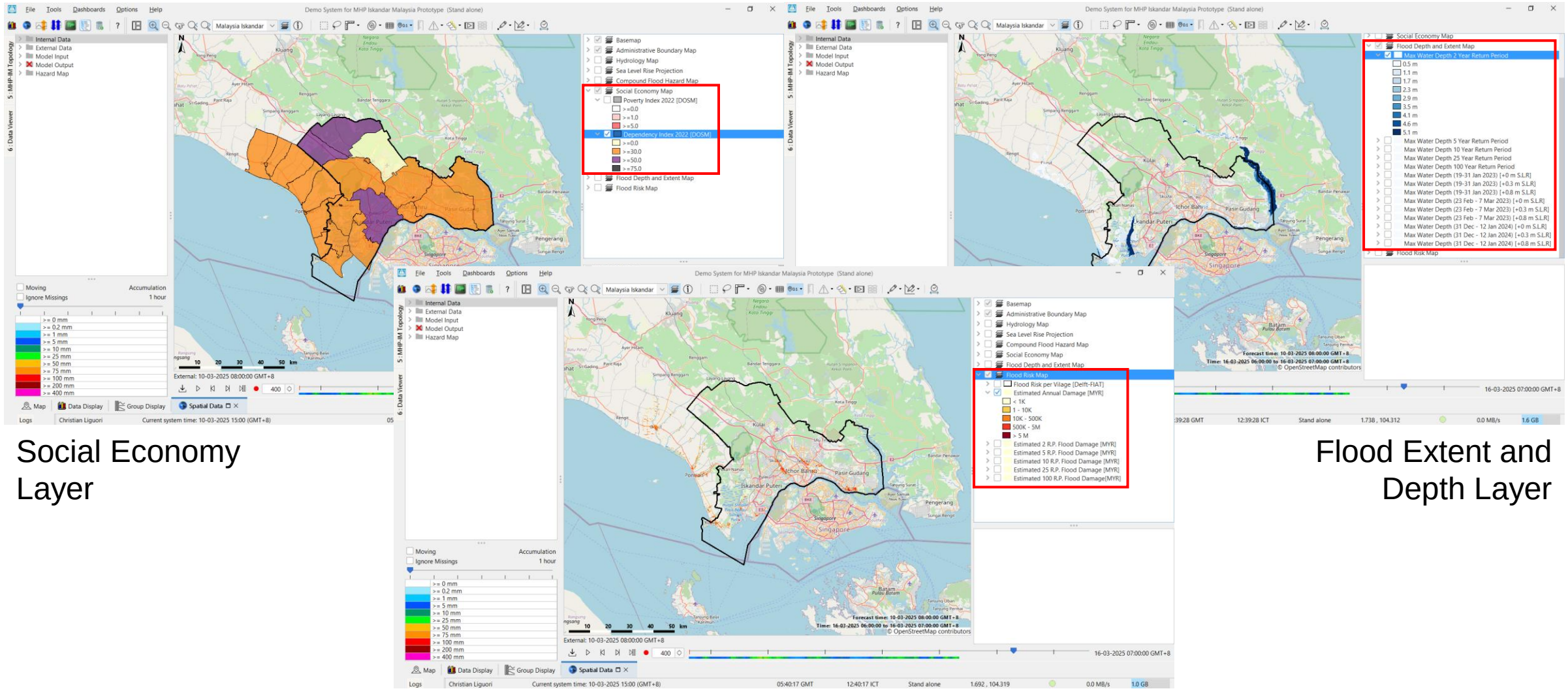


Flood forecasting using SFINCS model



Max water depth 5 year return period

Map Layers inside MHP-IM



Social Economy Layer

Flood Extent and Depth Layer

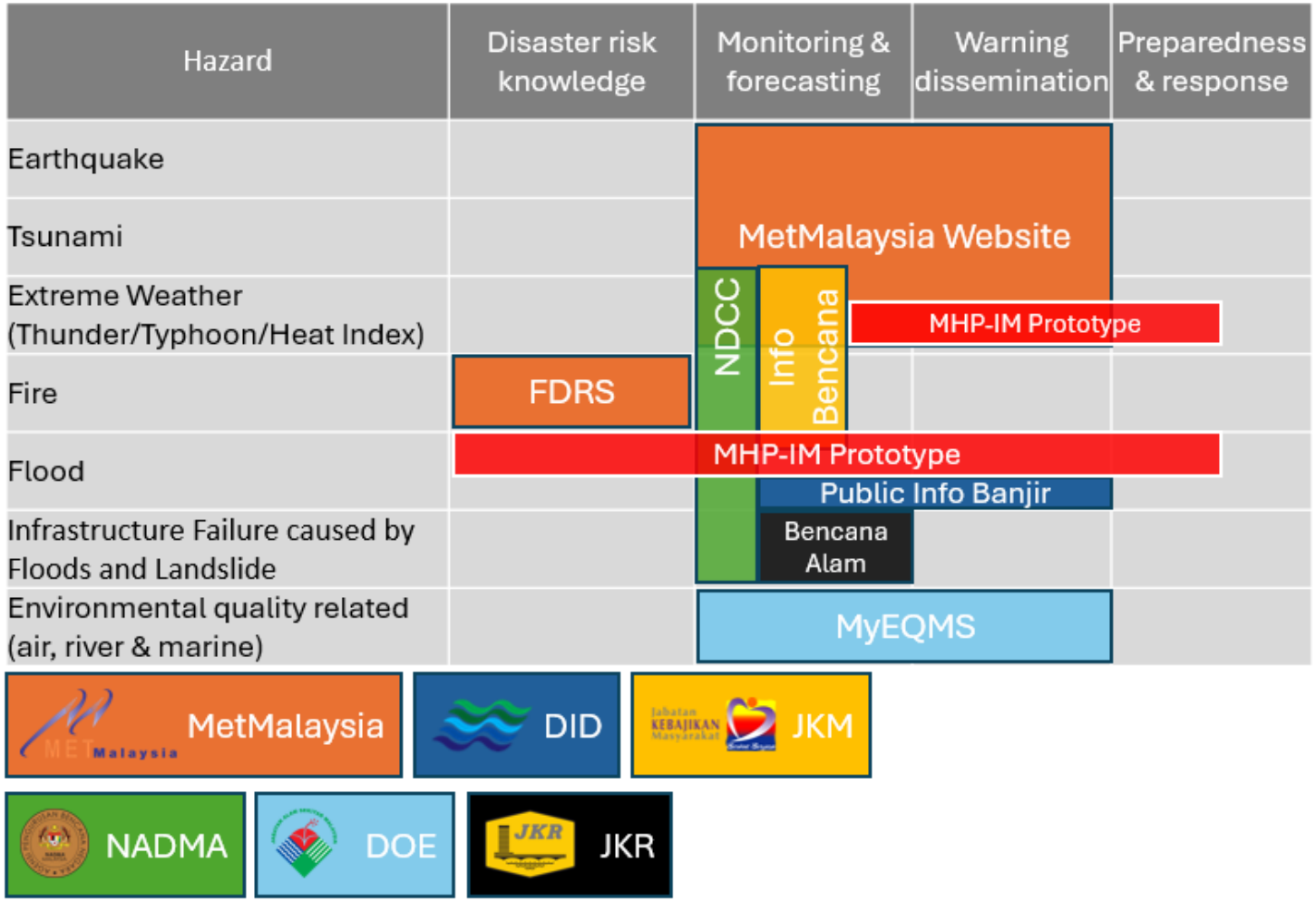
Flood Risk & Damage Layer

Added Value of MHP-IM (2)

- Provides flood risk knowledge
- Does monitoring & forecasting
- Provide warning via report and changes in icon

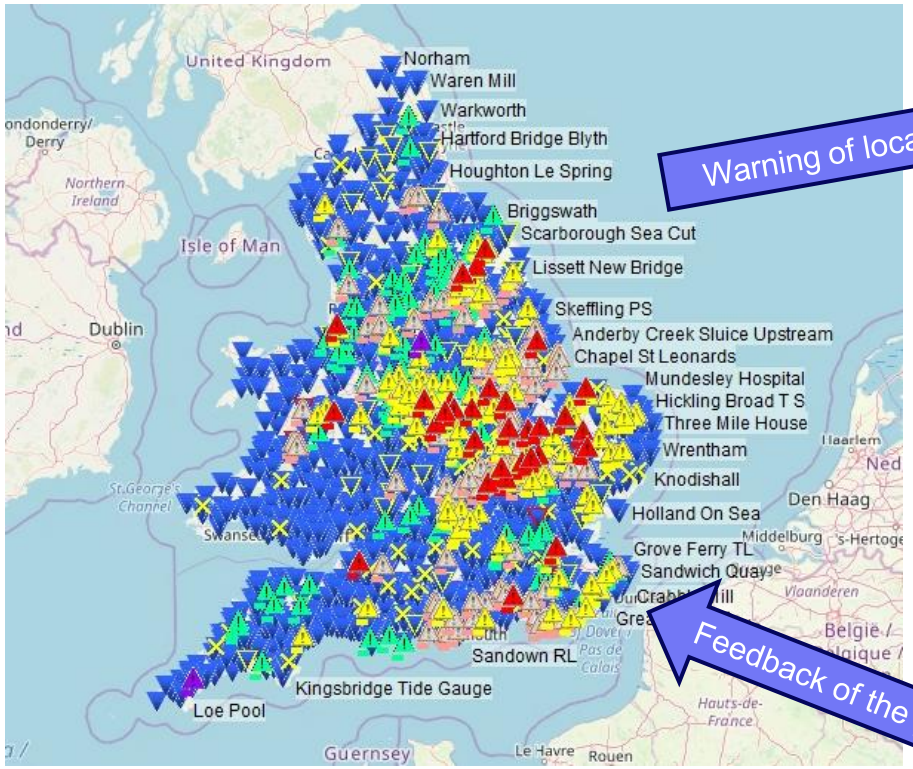
⚠	Alert level
⚠	Warning level
⚠	Danger level

- Preparedness → Provide estimate number of population affected that likely needs to be evacuated.

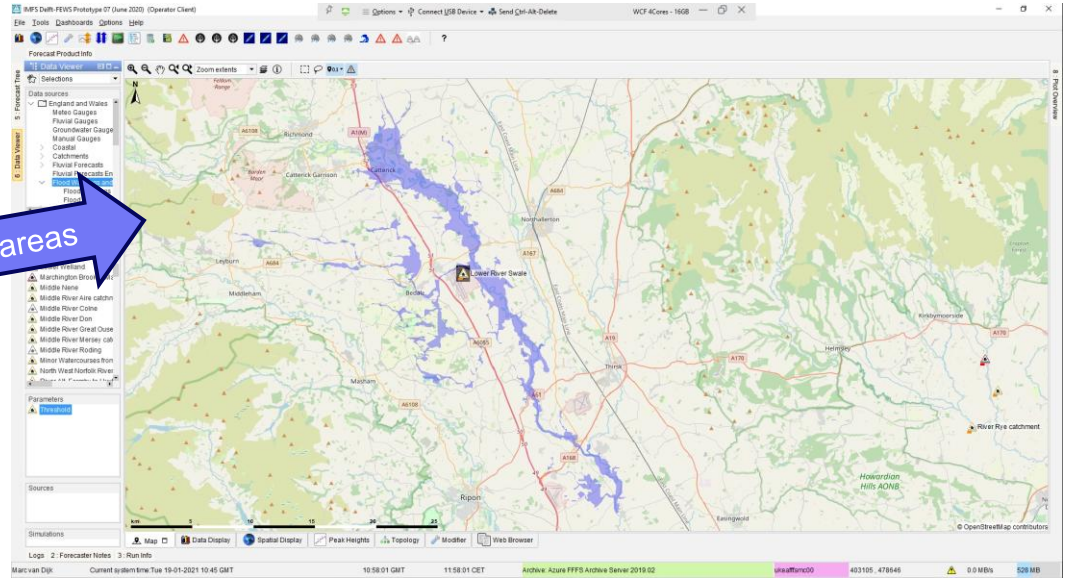


Suggestion for further development: Community-based inputs

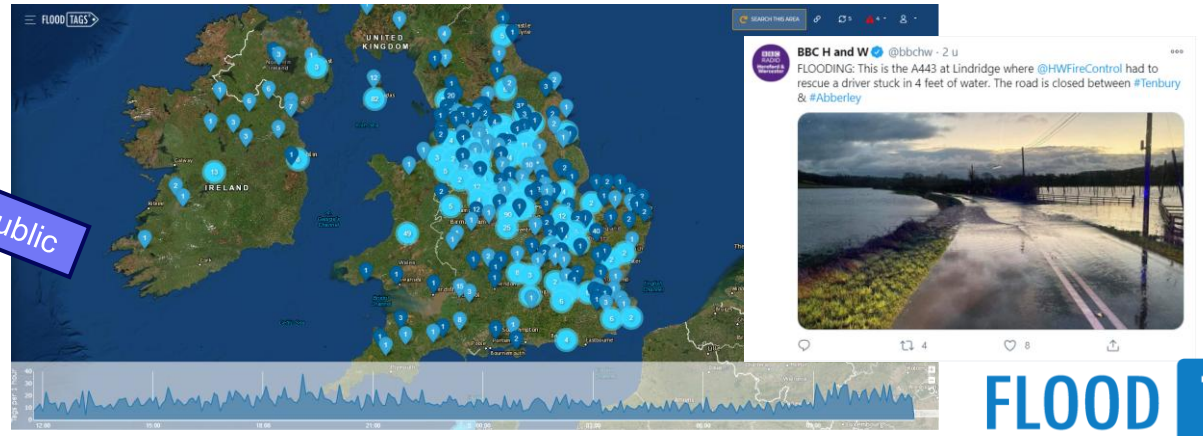
Integration of Flood Forecasting and Warning Process



Warning of local areas



Feedback of the public



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Q&A and Feeback Session

Feedback

What would be your recommendation for enhancement?

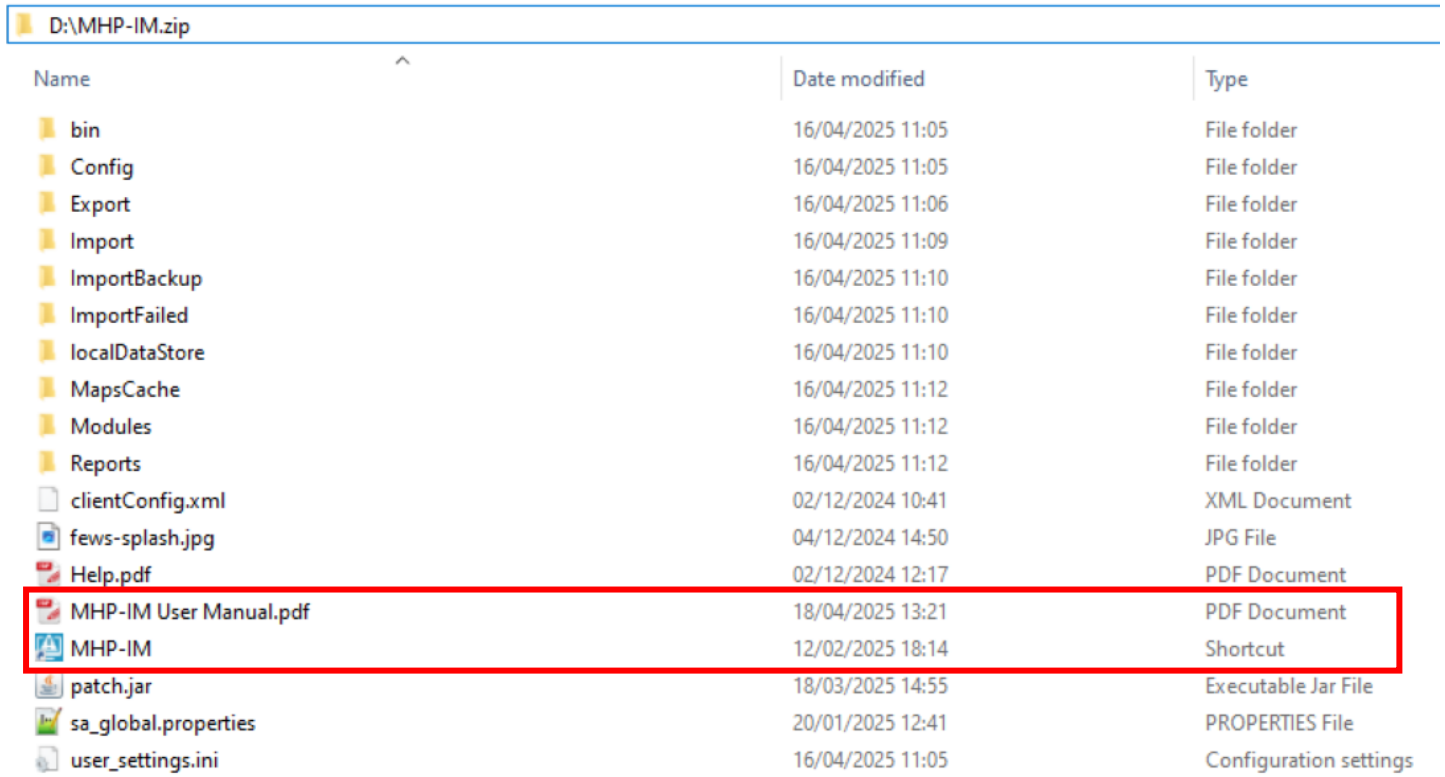
(For the future.., what could be the major improvement still.)

1. Data
2. Hazards

Handover of MHP-IM & User Manual

MHP-IM Prototype

- MHP-IM together with its user manual are provided inside MHP-IM.zip.
  - MHP-IM.exe → shortcut to open MHP-IM SA
  - MHP-IM User Manual.pdf → User manual of MHP-IM



User Manual

DRAFT

UTM Deltares

Development of a Multi-Hazard Platform (MHP) for forecasting local level climate extremes and physical hazards for Iskandar Malaysia

MHP-IM User Manual

CTCN ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Installation of MHP-IM SA

DRAFT

UTM Deltares

Development of a Multi-Hazard Platform (MHP) for forecasting local level climate extremes and physical hazards for Iskandar Malaysia

MHP-IM User Manual

CTCN ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Manual for MHP-IM SA

DRAFT

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CTCN ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Opening MHP-IM WebOC

DRAFT

UTM Deltares

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CTCN ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

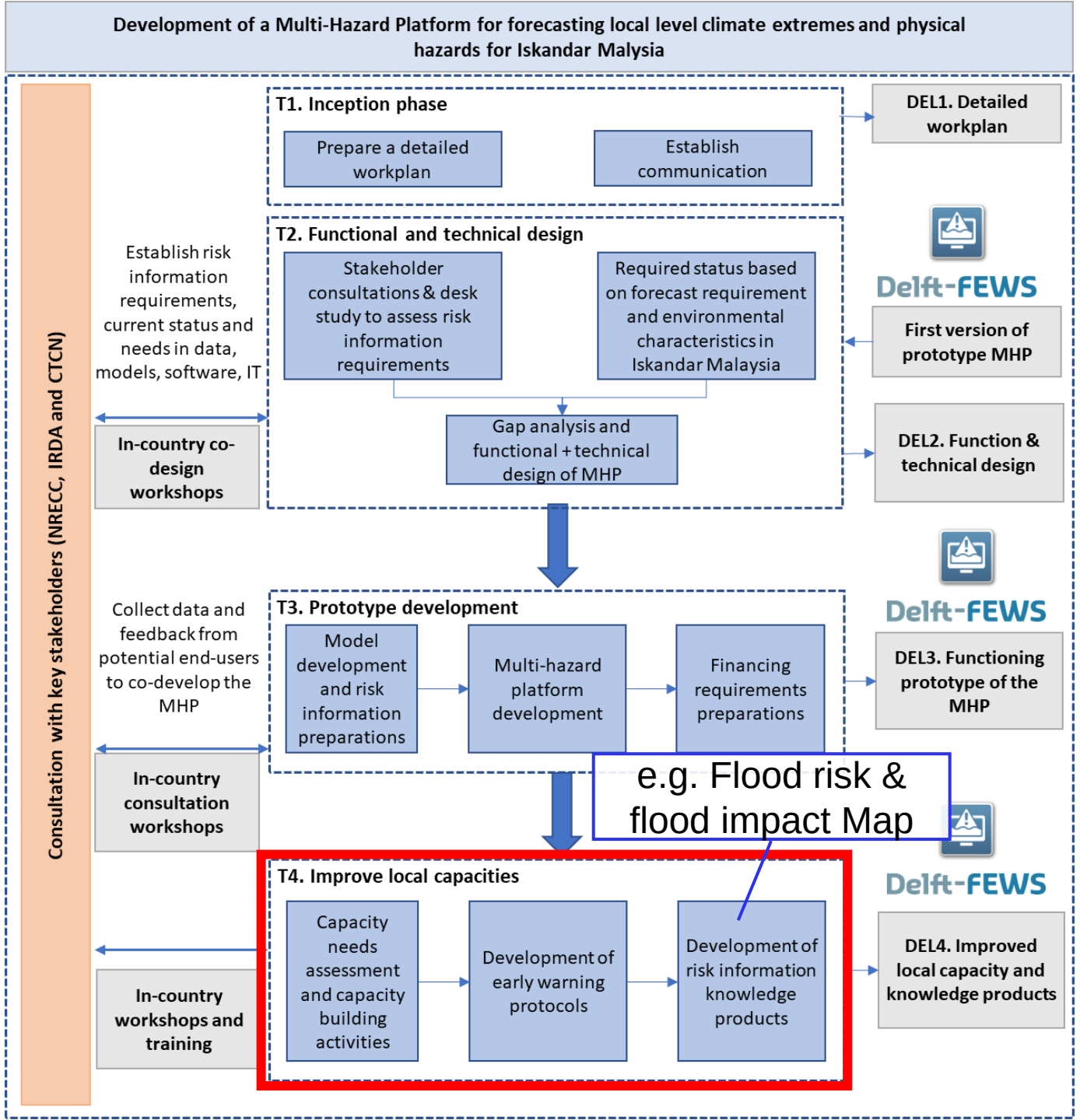
User Needs & Information Requirements Session

Preparation for the next phase

Now:
End of Phase 3 + start of phase 4

Next:

- Develop knowledge products – Phase 4



Capacity Need Assessment and Capacity Building Activities

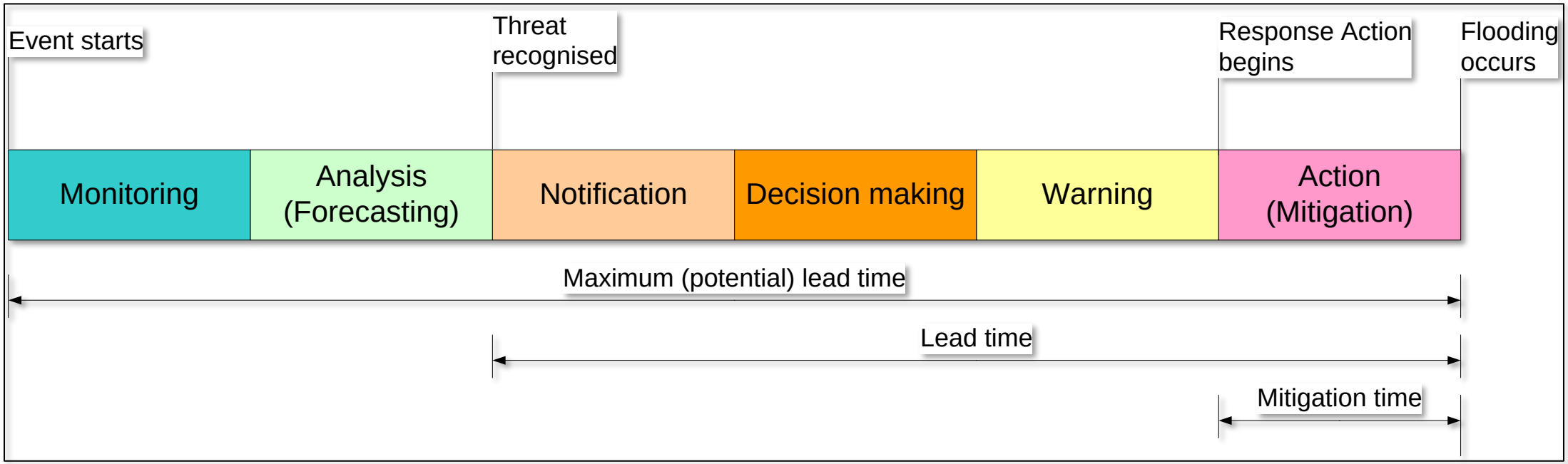
- Capacity building assessment will be done by sending out questionnaire
- The questions that will be included in the questionnaire will be about:
  - Financing capacity
  - Technical capacity (to address what topic still needs to be improved)
  - …
- The result of the capacity building assessment will be used to tailor the gender-sensitive training program and include a definition of the targeted groups to be considered (e.g., people- vulnerable groups and infrastructure- selected businesses/industries).
  For example:
  - Training program

    Topic 1 …, for …

    Topic 2 …, for …

    Topic 3 …, for …

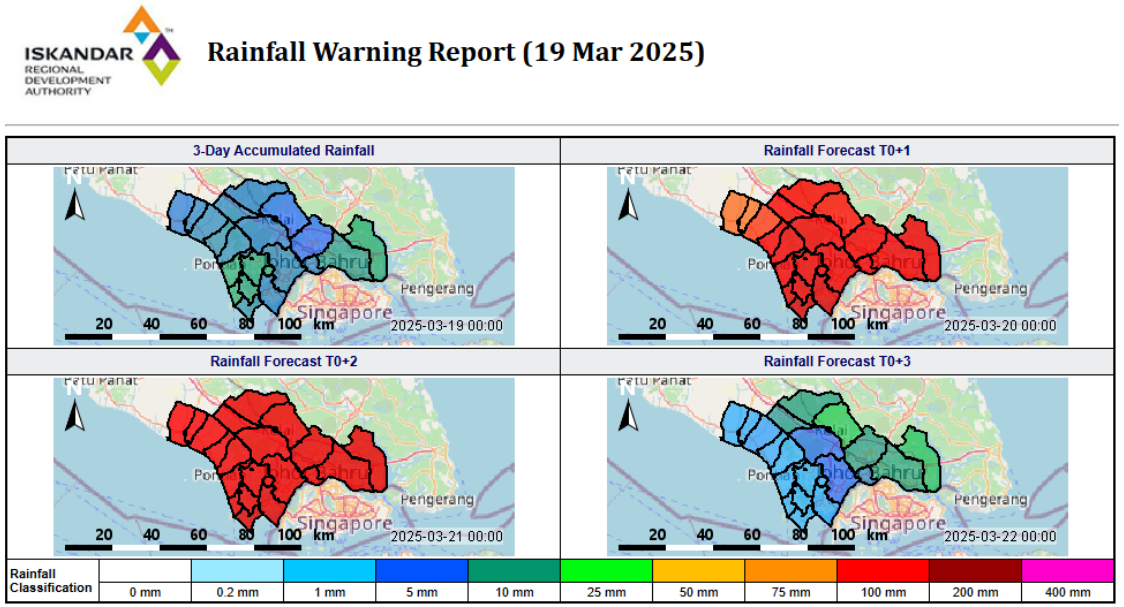
Development of Early Warning Protocols

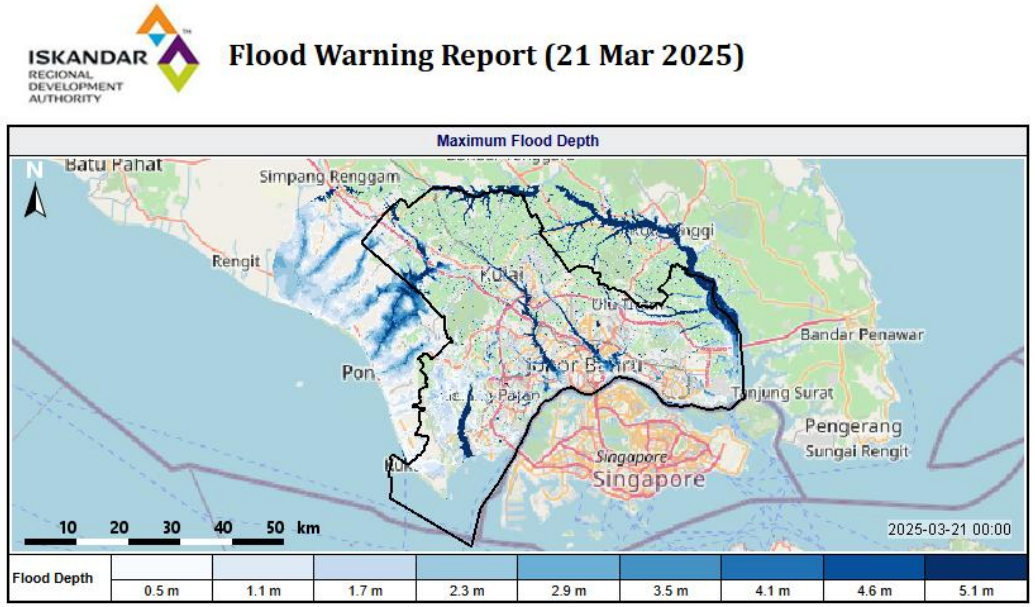


Add examples from the NL.

Development of Risk Information Knowledge Product

- Different user group need different information in times of crisis
- T.A. will send out questionnaire to decide which risk information knowledge product will be added or further developed

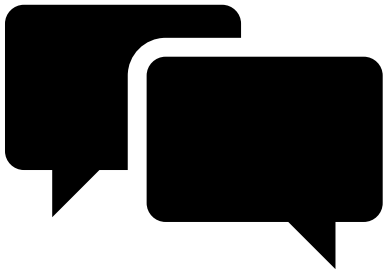




Survey and Discussion Session

Survey:

1. **Capacity need assessment**
   a. Technical capacity
2. **Risk information knowledge product**
   a. Do you think the current report which can be produced by MHP-IM is already useful?
   b. What information do you want to see? For what sector?
   c. Do you have any suggestion on how the report should look like?
   d. ….



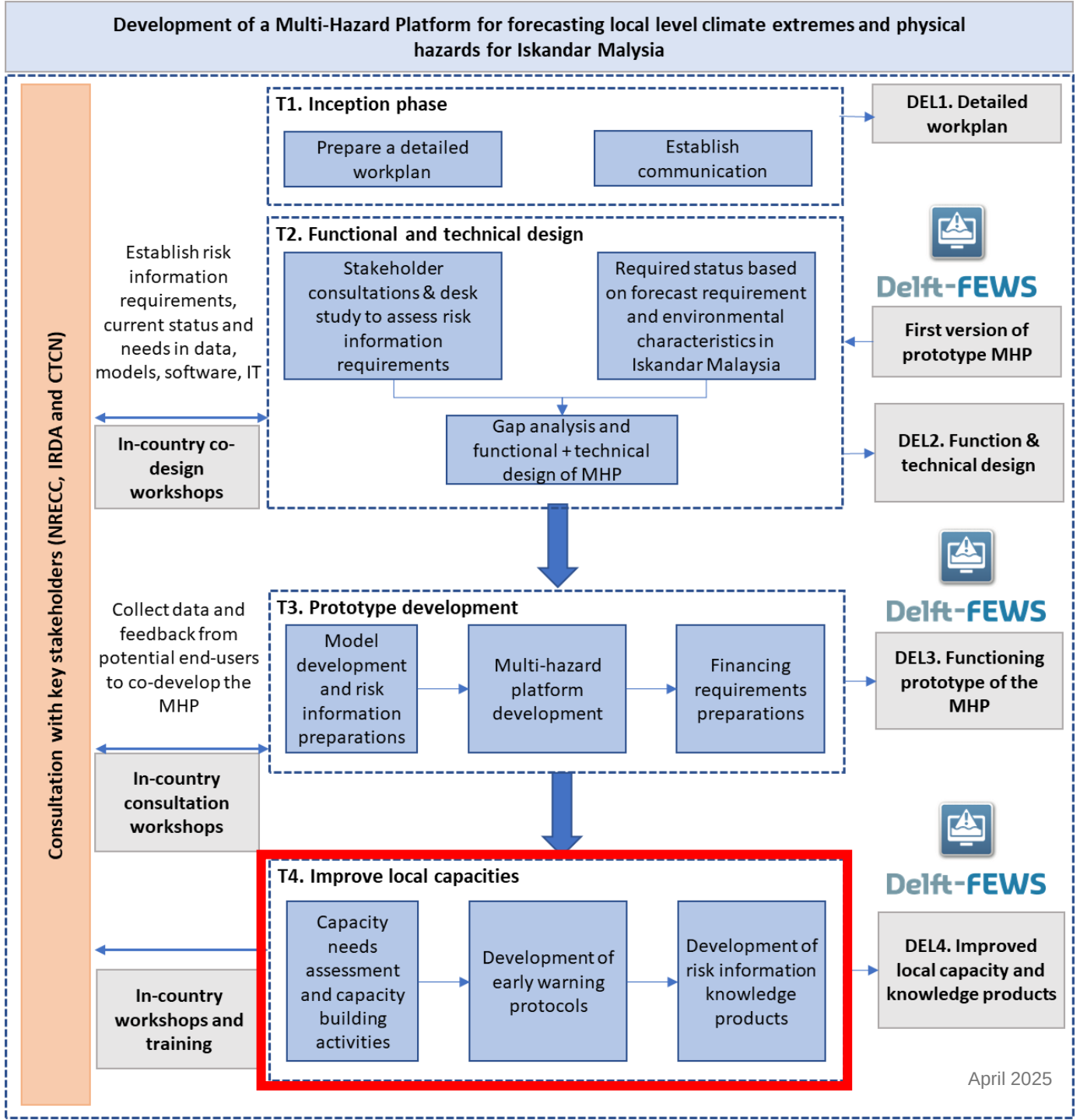
Wrap-up & Next Step

Preparation for the next phase

Now:
End of Phase 3 + start of phase 4

Next:

- Develop knowledge products – Phase 4



Thank you

www.deltares.nl

@deltares

linkedin.com/company/deltares

info@deltares.nl

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