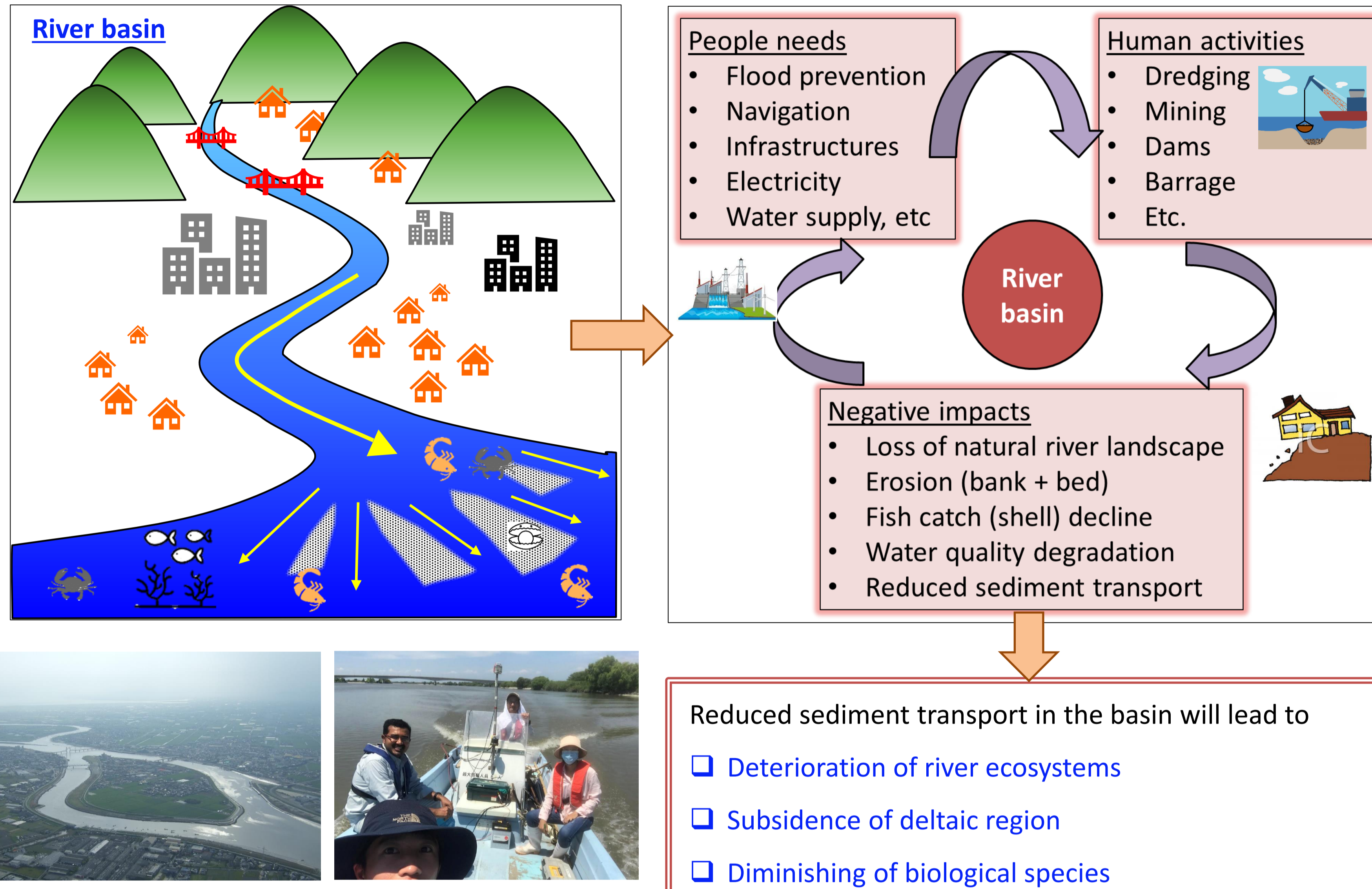
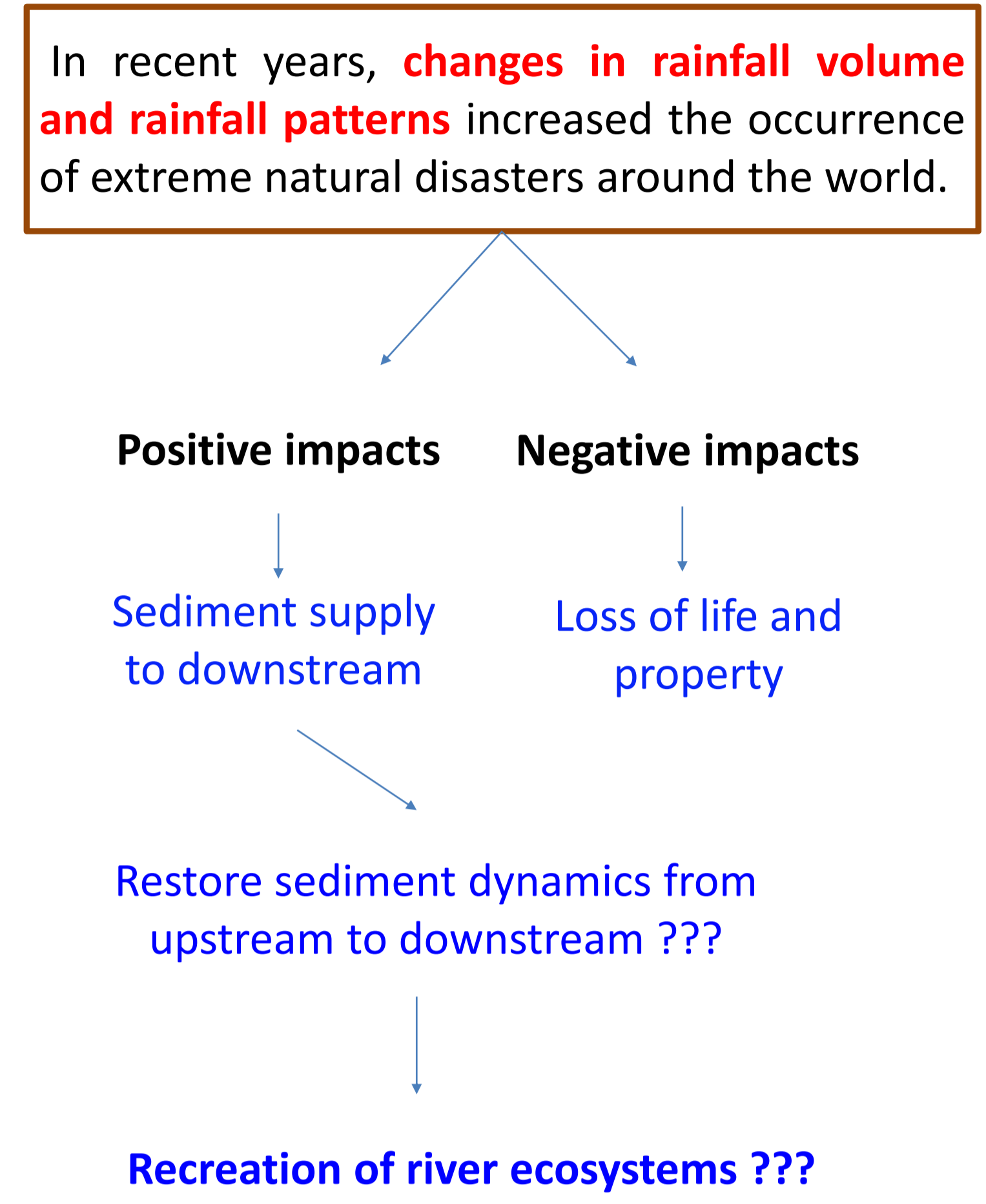


Background



Effect of climate change



Methodology

Objectives

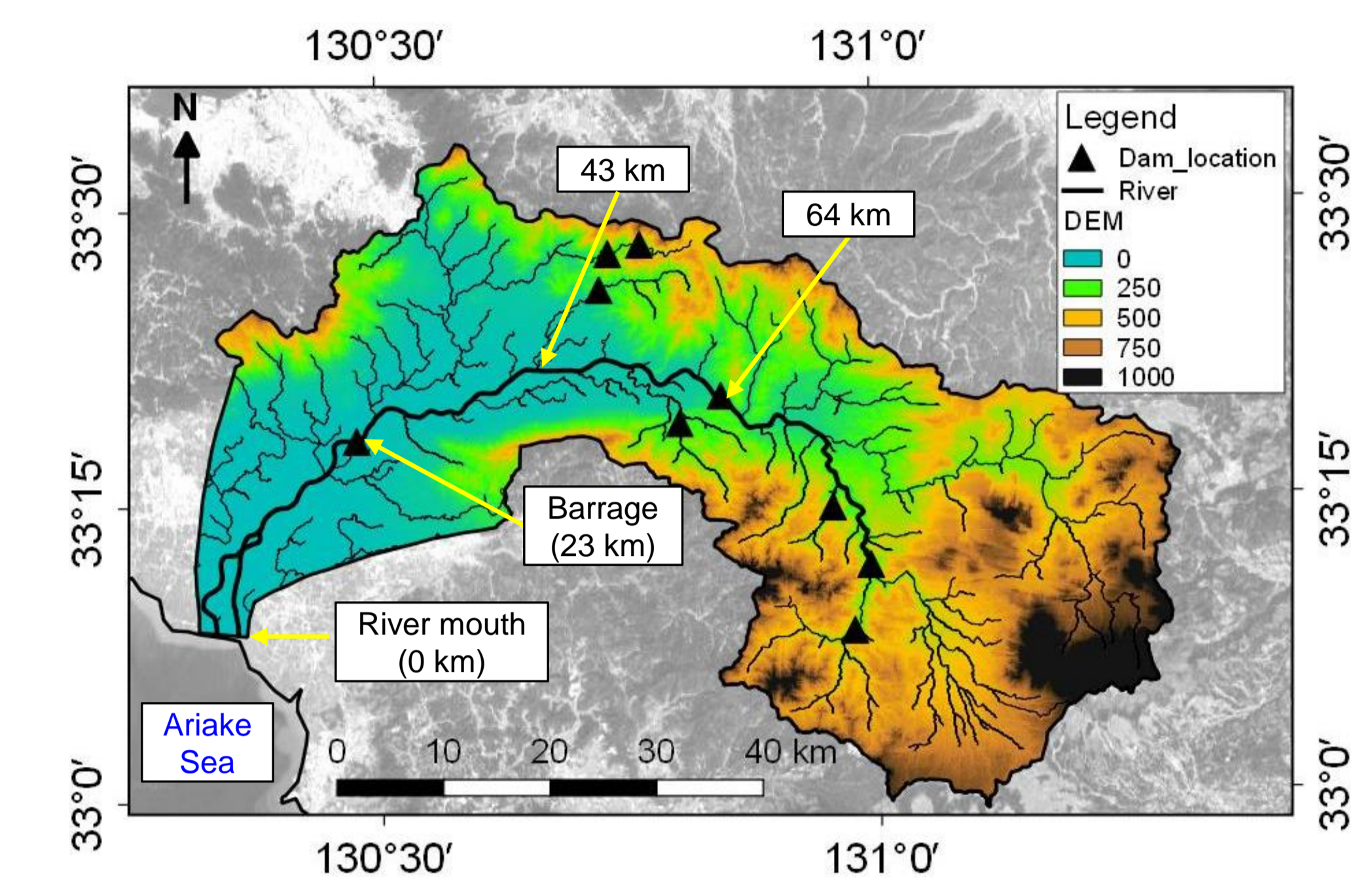
To know how much sediment amount has been changed by human activities and disasters

- To determine the **long-term riverbed variation and sediment volume changes** influenced by both human activities and recent climate change disasters
- To discuss the **effects of past human activities and recent disasters** on **sediment transfer process of the river**

Status of river improvement works during the study period

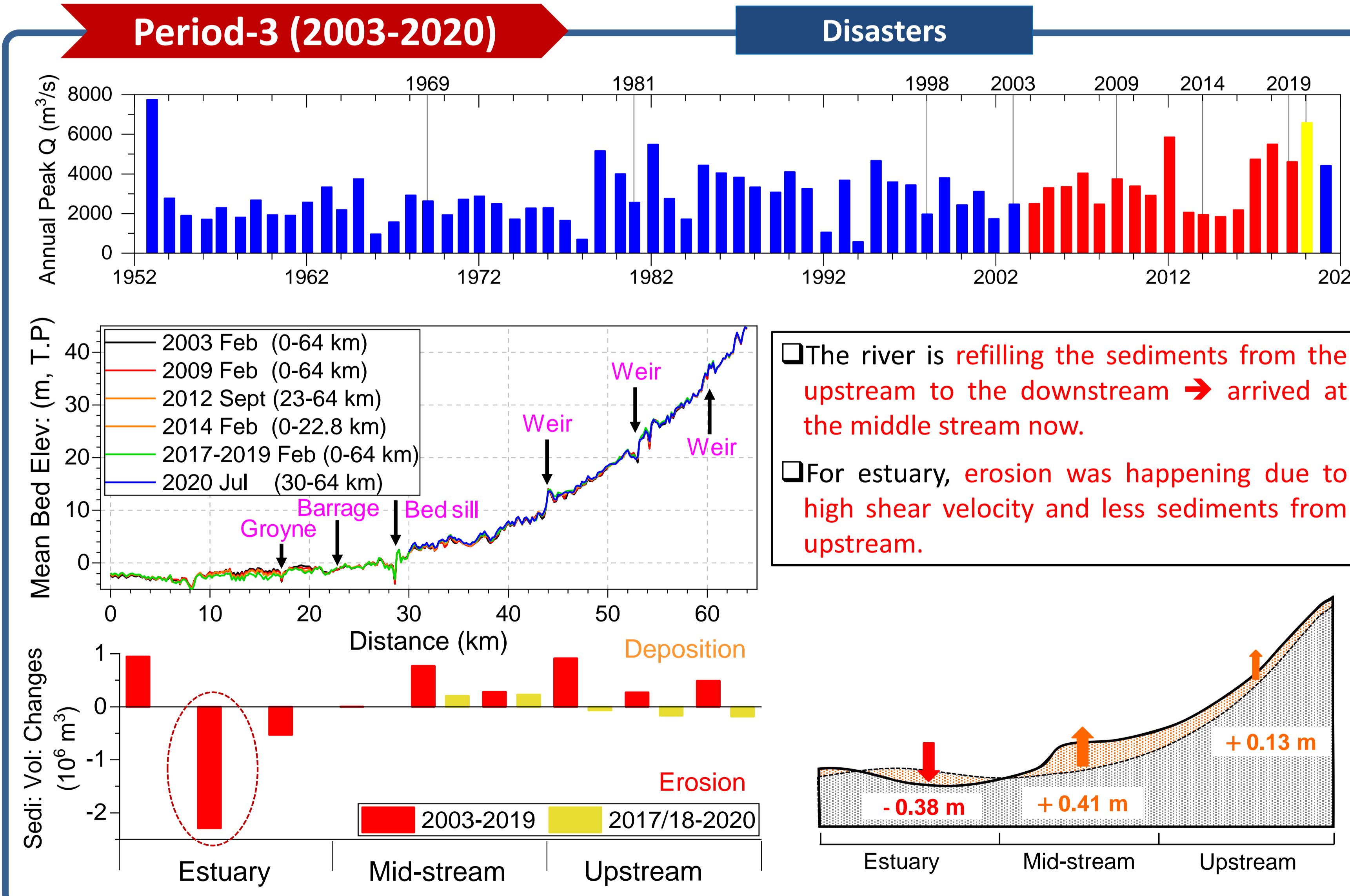
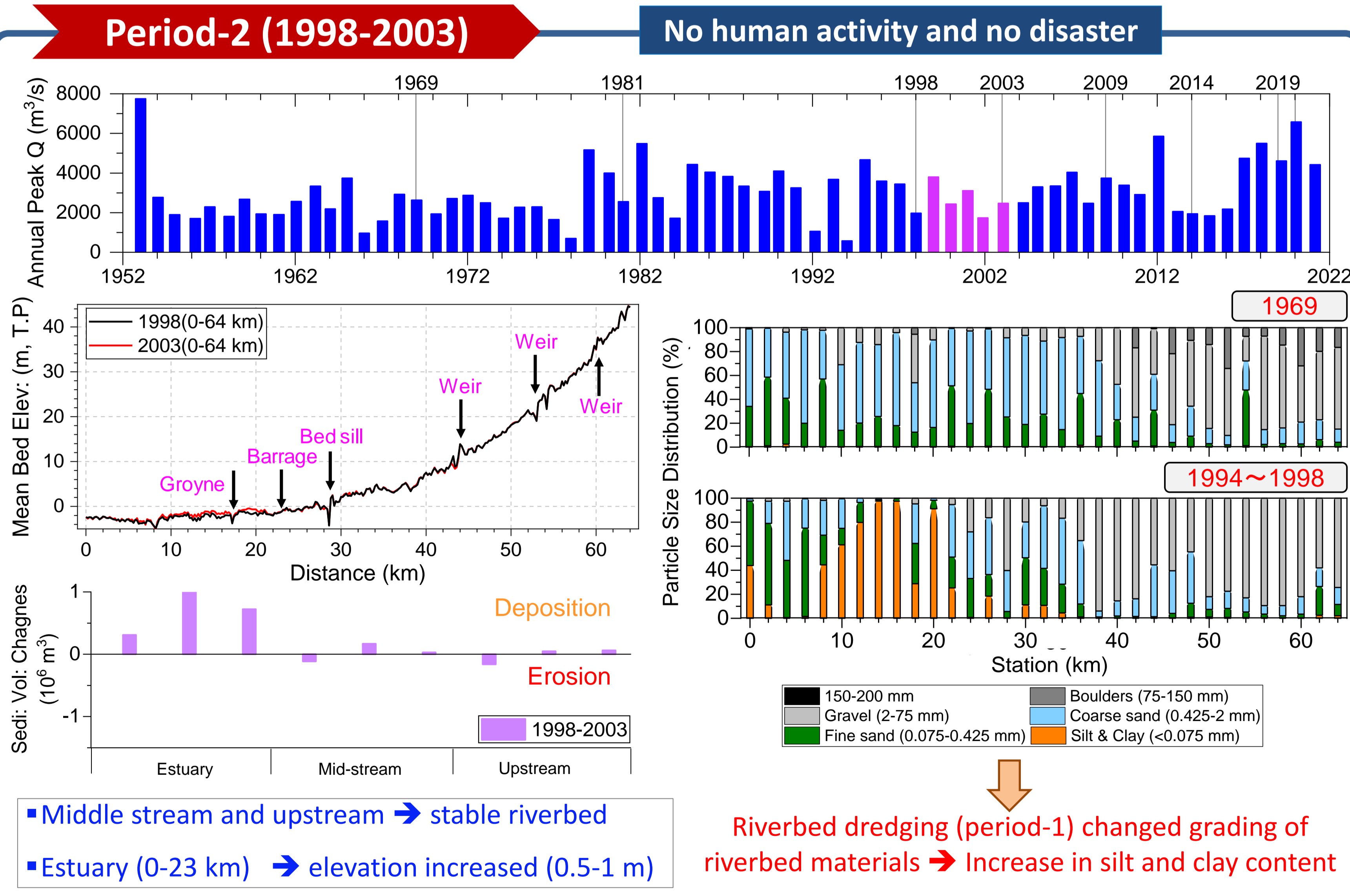
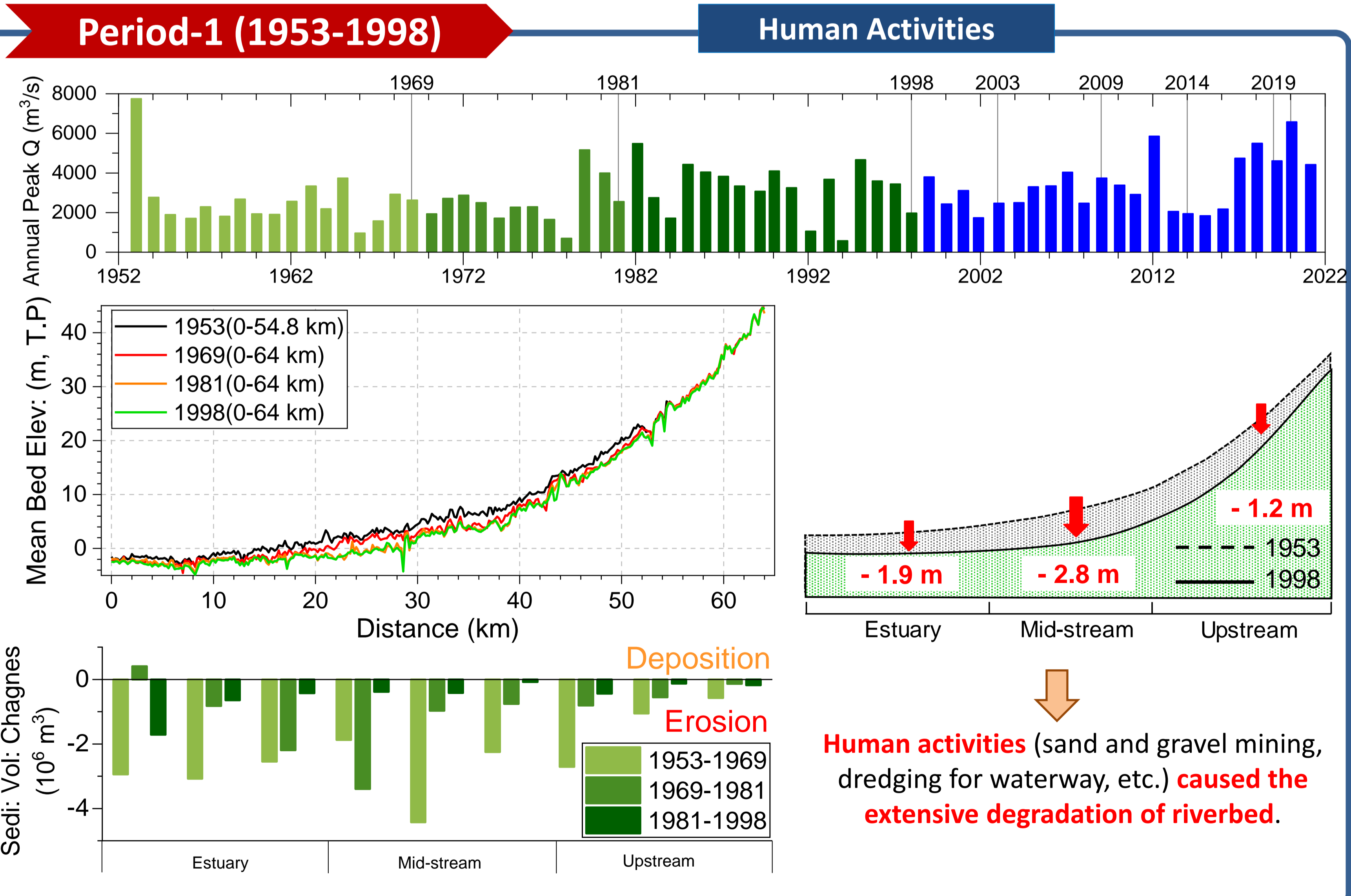
Period	Year	Disasters and River Works
Period-1 (1953-98)	1953	Channel excavation, dredging in downstream, gravel extraction for draining and filling
	1961	Gravel extraction for commercial use
	1968	Enforcement for gravel extraction
	1969	Completion of Shimouke Dam
	1970	Completion of Matusbara Dam
	1983	Completion of Chikugo Barrage
Period-2 (1998-03)	1999	Gravel extraction stopped
	2003-05-09	No human activity and no disaster
Period-3 (2003-20)	2012	Landslide disasters in upstream areas
	2017	Flooding triggered by torrential rainfall
	2020	Deadly landslide disasters in Asakura city Flood with 2 nd highest river discharge

Study Area - The Chikugo River, Japan



Total length	143 km (study area → 0-64 km)
Watershed area	2860 km ²
Annual rainfall	2100 mm
0-23 km → Macro tidal estuary	
Tidal range	1.5 m (neap) - 5 m (spring)
Tidal discharge	500 m ³ /s (neap) - 2000 m ³ /s (spring)

Results and Discussions



Conclusions

- ❖ Non-uniform morphological changes were found because of the consequences past human activities
- ❖ Riverbed degradation occurred during period 1.
- ❖ Sediments transport to the downstream increased due to the disasters and it has already arrived until the middle stream.
- ❖ Sediments supplied by the disasters are expected to arrive downstream near future.

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