



Sedimentation patterns in floodplains of the Mekong Delta - Vietnam

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1. Study area – study objectives
2. Methodology
 - Model setup
 - Data and model calibration
3. Results
 - Sediment-nutrient transport
 - Sediment-nutrient deposition
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Study area - Study objectives

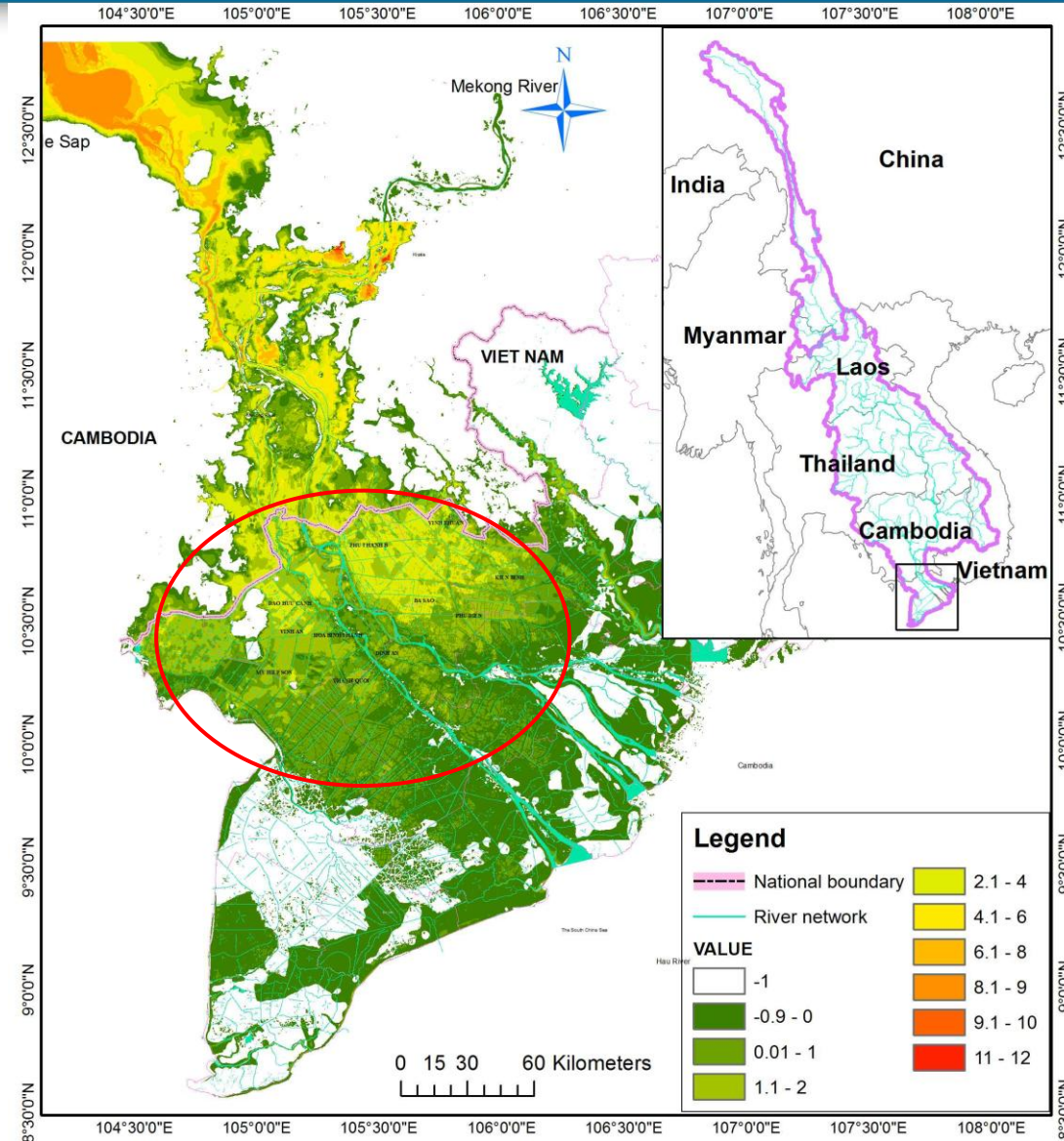
Study area: whole the MD

Focus on the Vietnamese MD

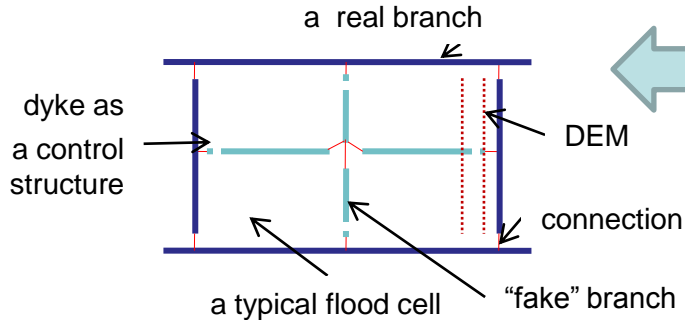
Hot issues on flood control:
low dike or high dike

Objective

Quantification of sediment-
nutrient deposition in the
floodplains of the Mekong Delta



1. Quasi-2D hydrodynamic model (Dung al et, 2011)



Dike systems: 2011 updated

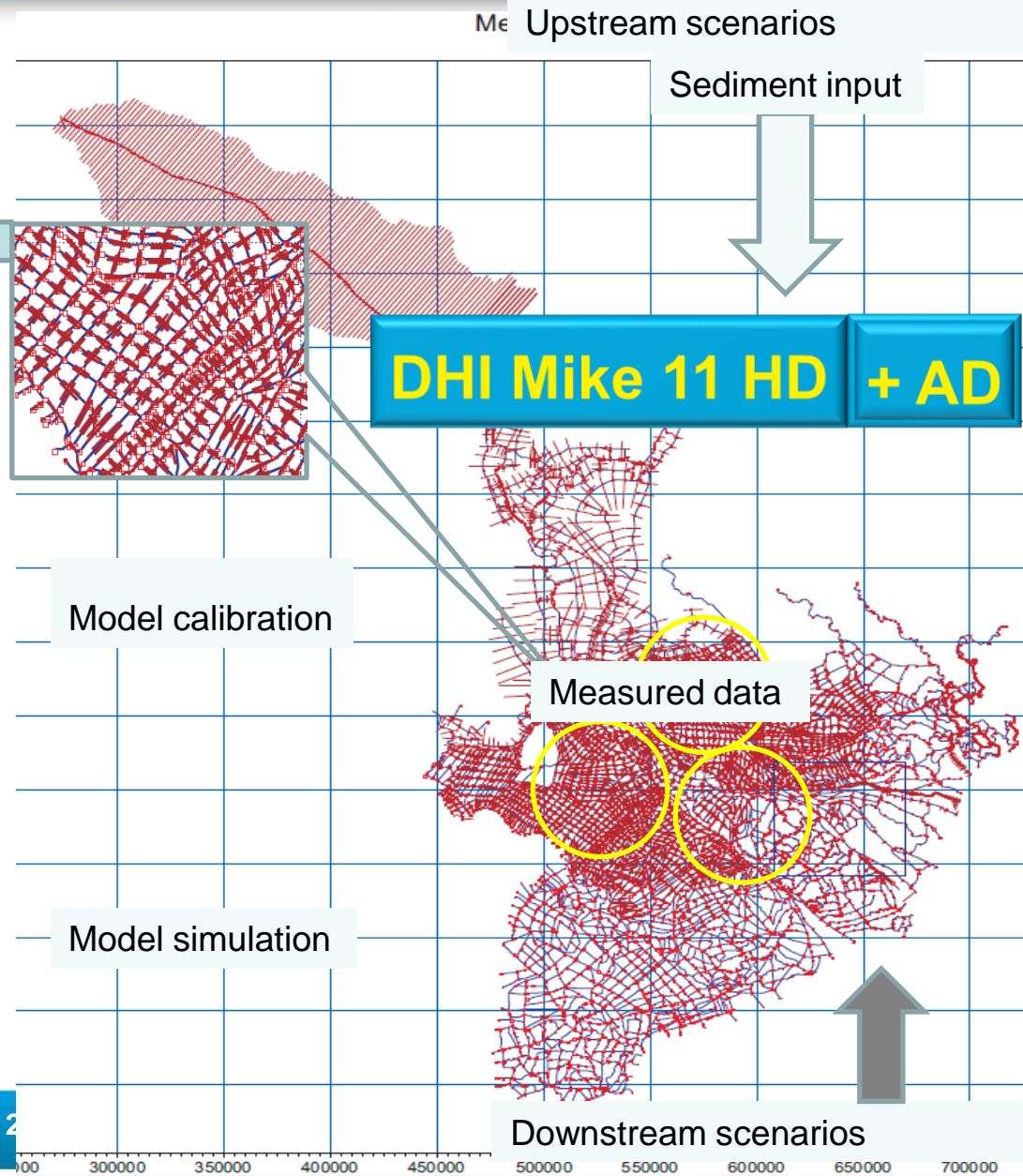
2. Cohesive sediment transport model

- Falling velocity
- Deposition critical shear stress
- Erosion critical shear stress

(Hung al et, 2013).

Calibration parameter:

Dispersion coefficient



Data

- MRC, WISDOM, SIWRR, SRHMC,
- Measured sedimentation in 11 floodplains in flood 2011 (Manh al et., 2013, under review)

Calibration method:

Multi-objective auto-calibration for HD model and AD model.

Calibration results:

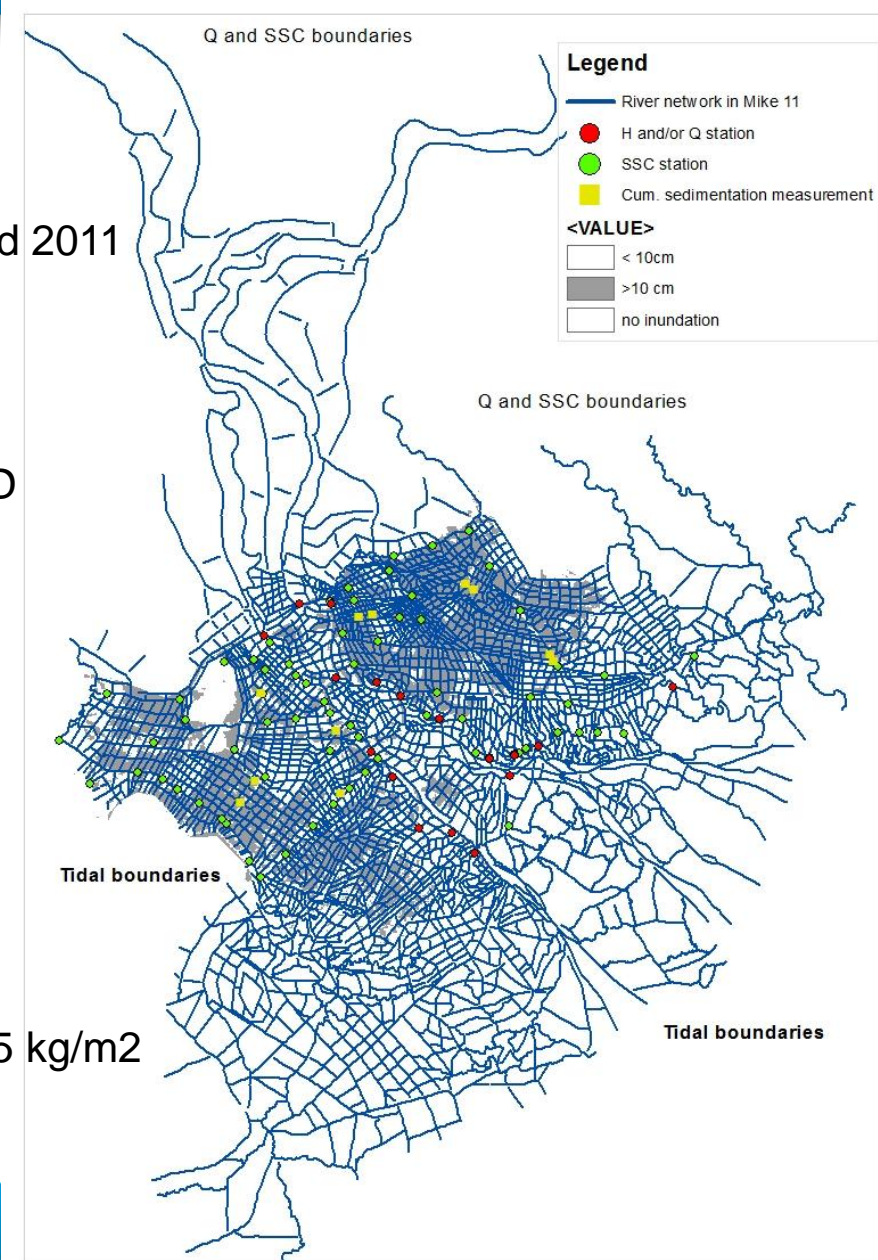
HD: H at 13 stations - NSE = 0.81

Q at 10 station - NSE = 0.66

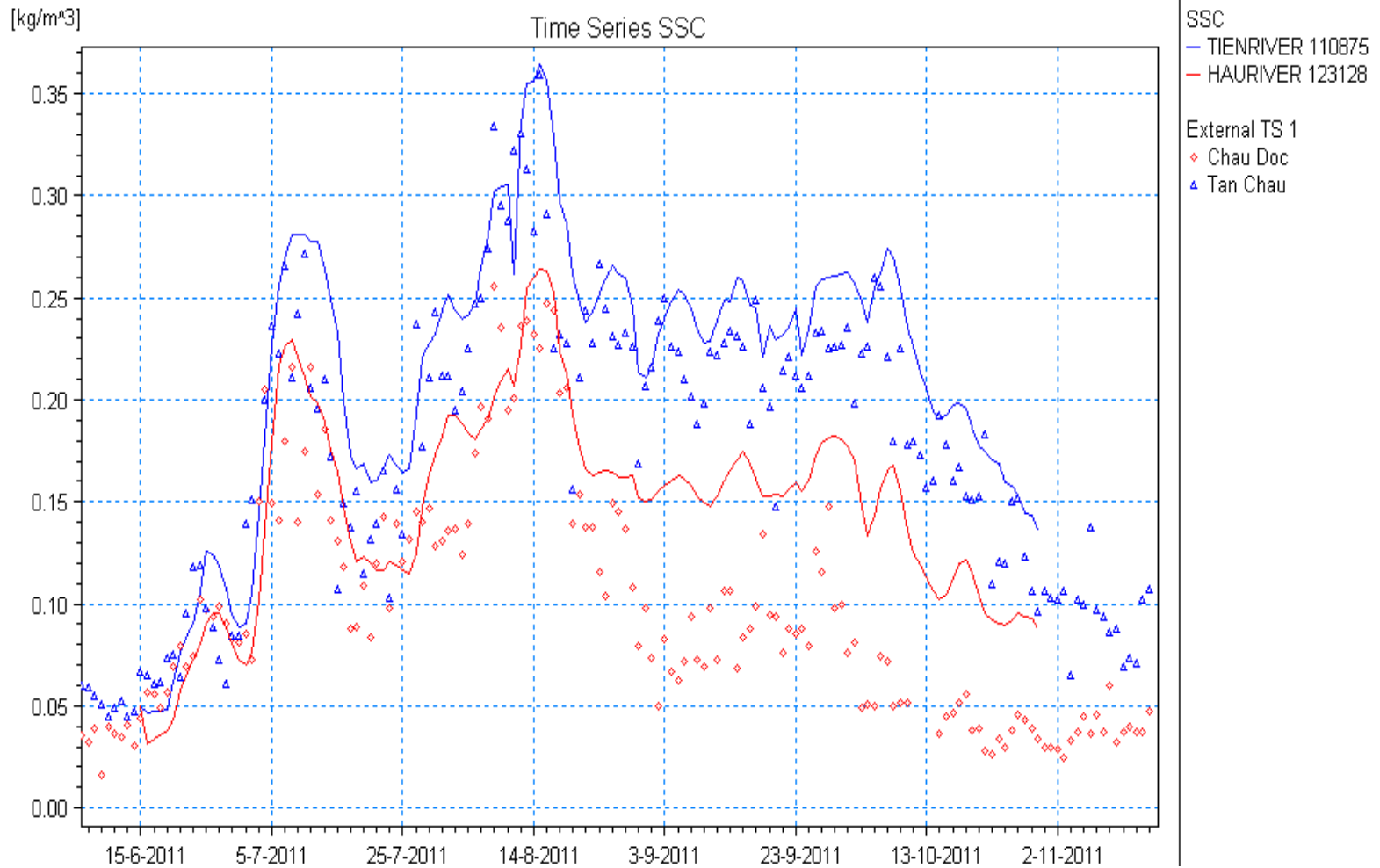
Inundation extended - NSE = 0.45

AD: SSC in 80 stations – RMSE = 0.078 kg/m³

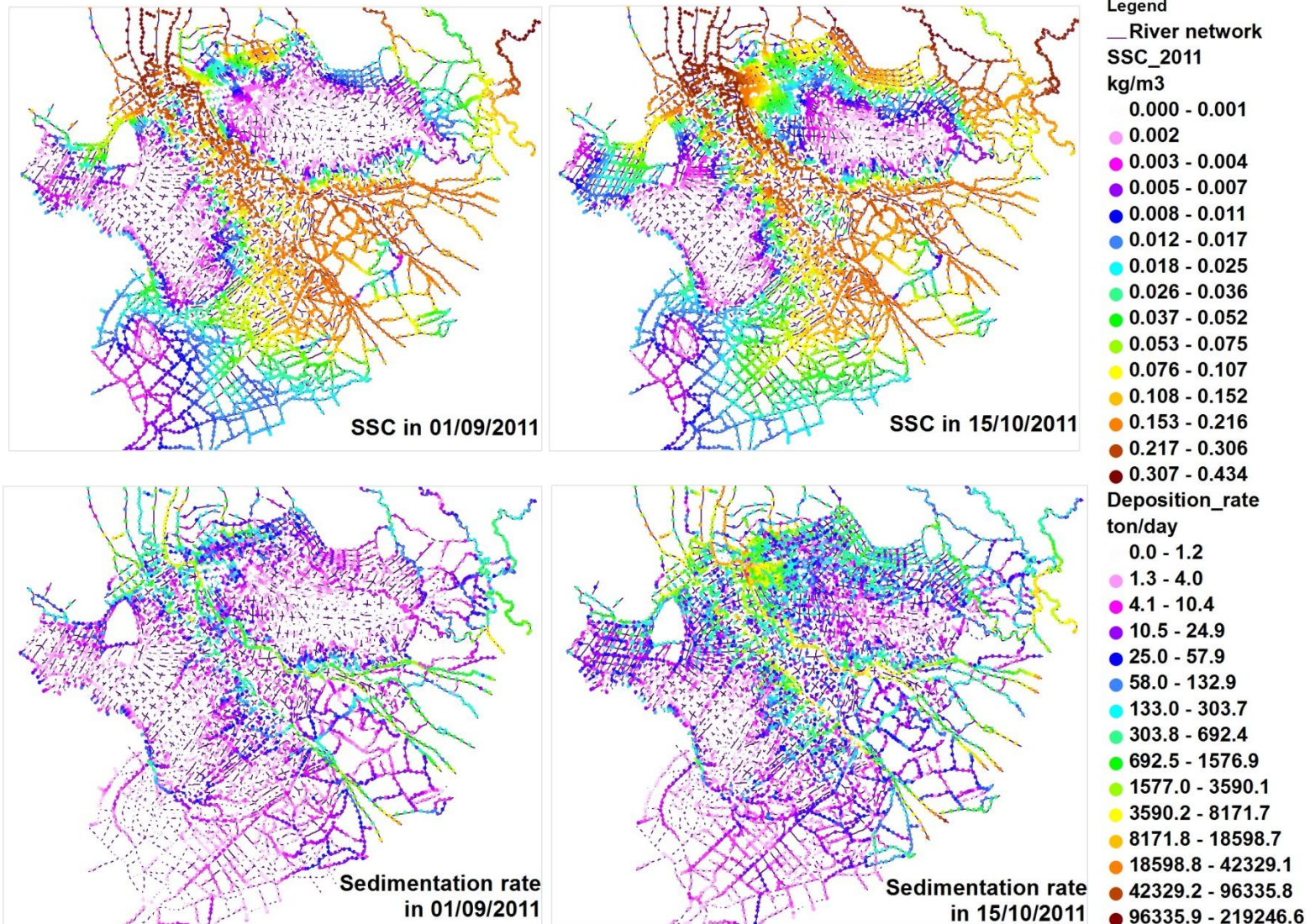
Sedimentation in 11 floodplains – RMSE = 28.5 kg/m²



Observed and calculated SSC at Tan Chau and Chau Doc

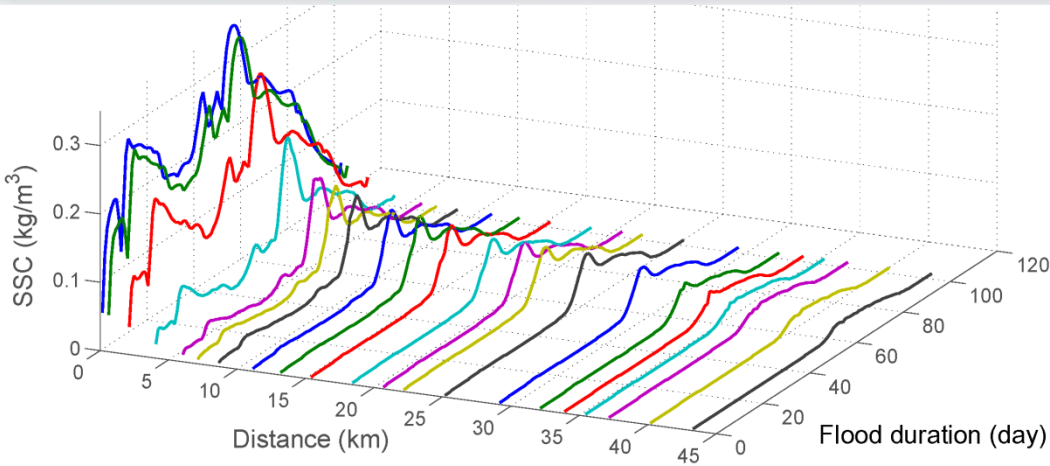


Results – sediment and sedimentation

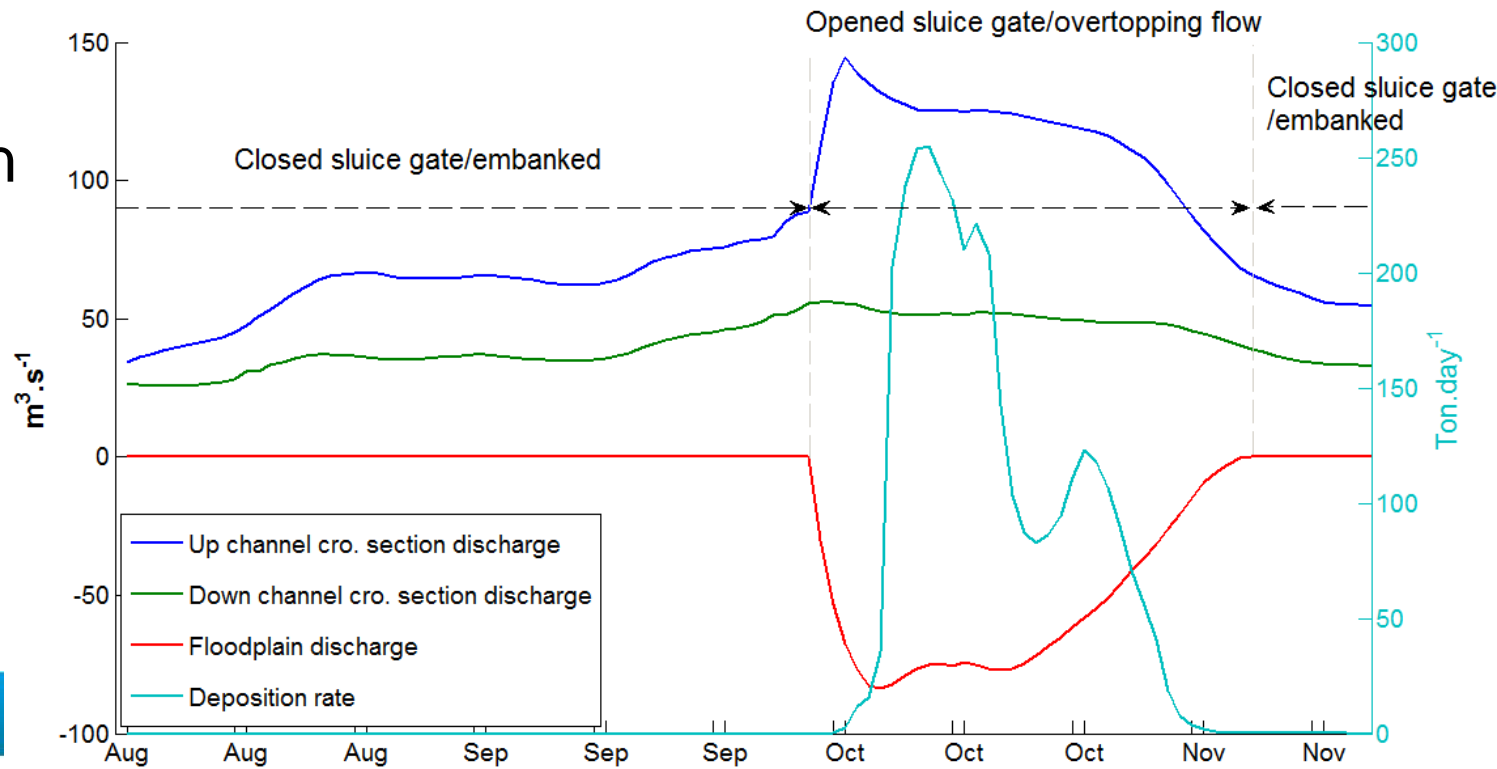


Results – floodplain sedimentation

Reduction of SSC along a main channel



Sedimentation rate in controlled compartment



Sediment transport from Kratie to river mouths

Location	2011 - extreme flood		2009 - normal flood	
	Total load	% Kratie	Total load	fraction
Kratie	111	100%	92.7	100%
VMD	61.4	55%	53.7	58%
Tan Chau	51.2	46%	44.8	48%
Chau Doc	10.2	9%	8.9	10%
Vam Nao	19.5	18%	16.3	18%
Lower VMD	43.1	39%	34.5	37%
My Thuan	20.2	18%	16.2	17%
Can Tho	22.9	21%	18.3	20%
Overbank flow	12.8	12%	9.9	11%
Floodplain	18.3	16%	19.2	21%

Trapped sediment-nutrient in compartments in VMD

	fractions	Flood -2011	Flood - 2009
Deposition (mil ton)		4.6	4.8
Nitrogen (ton)	0.34%	15,564	16,320
Phosphorus (ton)	0.14%	6,409	6,720
Potassium(ton)	1.59%	72,782	76,320
Organic Carbon (ton)	4.70%	215,143	225,600

Initial information of flood benefit in floodplains

- Total sediment load comes to VMD is from 50-60% total sediment load at Kratie
- Total sediment trapped in floodplain compartments in the VMD is around 4-5% of total sediment load at Kratie.
- The sedimentation patterns in compartment is strongly influenced by control structure operations, distances to the main rivers.
- The model can apply to estimate the impacts of hydropower dams on sediment transport and sediment distributions in the MD.

Thanks for your attention!

Results – sedimentation map

