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The past and future dynamics of salt intrusion in the Mekong Delta

Sepehr Eslami^{1,2*},

Maarten van der Vegt¹, Piet Hoekstra¹, Philip S. J. Minderhoud^{3,4},
Nam Nguyen Trung⁵, Jannis M. Hoch^{1,6}, Edwin H. Sutanudjaja¹,
Do Doc Dung⁵, Tran Quang Tho⁵,
Hal E. Voepel⁷, Marie-Noëlle Woillez⁸

¹ Utrecht University, Utrecht, NL

² Deltares, Delft, NL

³ University of Padova, Padova, Italy

⁴ Wageningen University, Wageningen, NL

⁵ Southern Institute for Water Resources Planning, HCMC, Vietnam

⁶ Imperial College London, London, UK

⁷ University of Southampton, Southampton, UK

⁸ Agence Française de Développement (AFD), Paris, France;

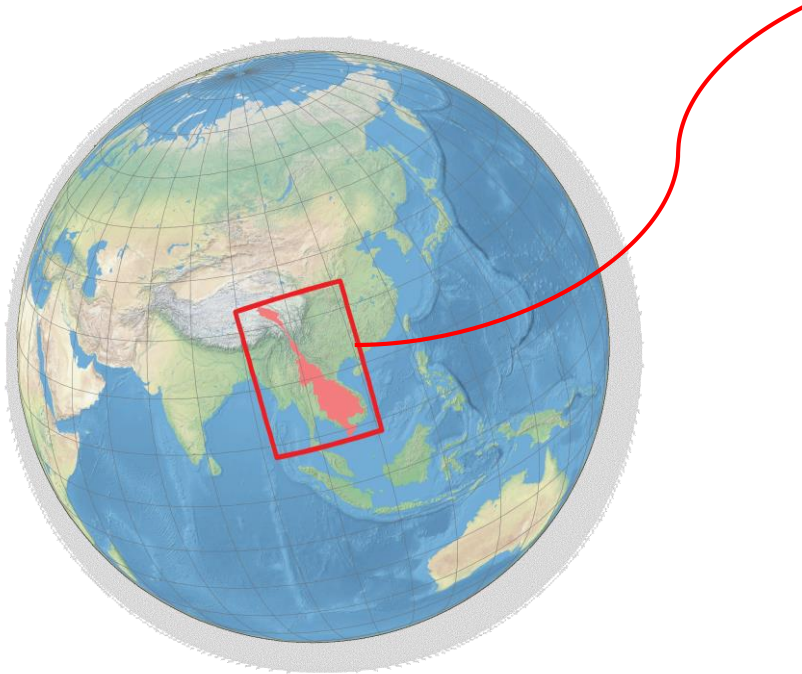
Contact person: Sepehr Eslami Arab, MSc

Email: s.eslamiarab@uu.nl or

sepehr.eslamiarab@deltares.nl



The Mekong



The “*rice bowl*” of South East Asia!

Home to more than 20 M people!

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Climate Change in the Mekong

Subject to significant Salt Intrusion

- Salt intrusion, key to land use in VMD.

Features | Environment

The great salt drought desiccating Vietnam's Mekong Delta

Farmers suffer huge losses and communities struggle amid high levels of seawater intruding into the freshwater delta.



THE ASEAN POST

Tuesday, 20 October 2020

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in f t i y

ENVIRONMENT

Saline intrusion threatens Mekong Delta

Vietnam's Mekong Delta region could suffer serious salt intrusion by the end of this month, according to the Southern Irrigation Institute.

VNA - Friday, January 25, 2019 11:28

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Tien Giang adopts new farming models amid climate change
Sunday, December 02, 2018 14:27



The Mekong Delta region is suffering from salt intrusion.

Hanoi (VNS/VNA) - Vietnam's Mekong Delta region could suffer serious salt intrusion by the end of this month, according to the Southern Irrigation Institute.

Saltwater could penetrate 40 to 50 km inland, the institute said.

Việt Nam News

THE NATIONAL ENGLISH LANGUAGE DAILY

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Saline intrusion threatens Delta

Update: January, 25/2019 - 04:00

f t i y



Viet Nam's Cửu Long (Mekong) Delta region could suffer serious salt intrusion by the end of this month, according to the Southern Irrigation Institute. — Photo phapluatvietnam

CỬU LONG DELTA — Viet Nam's Cửu Long (Mekong) Delta region could suffer serious salt intrusion by the end of this month, according to the Southern Irrigation Institute.

Saltwater could penetrate 40 to 50 km inland, the institute said.

The Mekong Delta basin is entering the dry season. Water levels in the river are low, and saltwater is intruding into the freshwater delta.

Friday, 2019-09-27

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Reducing damages caused by salt intrusion in the Mekong Delta

Monday, 2018-04-23 11:12:51

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A farmer on his dry rice field in the Mekong Delta province of Long An (Photo: VNA)

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NDO - The Mekong River Basin is currently in the mid-dry season of 2017-2018. The Mekong Delta is strongly affected by two different tidal regimes in the East Sea and the West Sea.

Friday, September 27, 2019 - 15:49:18

TOPICS: Party Building ASEAN Community East Sea Climate Change

ENVIRONMENT

Mekong Delta attempts to adapt to saltwater intrusion

Saltwater intrusion in the Mekong Delta is expected to worsen as the Mekong River will decline, according to the Ministry of Agriculture and Forestry.

VNA - Saturday, April 27, 2019 19:00

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Tuesday, April 09, 2019 16:31

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Sunday, April 07, 2019 14:16



A canal is dried in the Mekong Delta.

Khue Awards 2018 (Apr 21, 2018 16:29:28)

Seminar discusses environmental protection in developing tourism (Apr 21, 2018 11:19:27)

Khanh Hoa: Endangered 9 5kg sea turtle released back to the sea (Apr 18, 2018 16:18:42)

Localities step up measures against forest fires (Apr 17, 2018 15:52:08)

Mekong Under Great Threat

The ASEAN Post Team

28 June 2020

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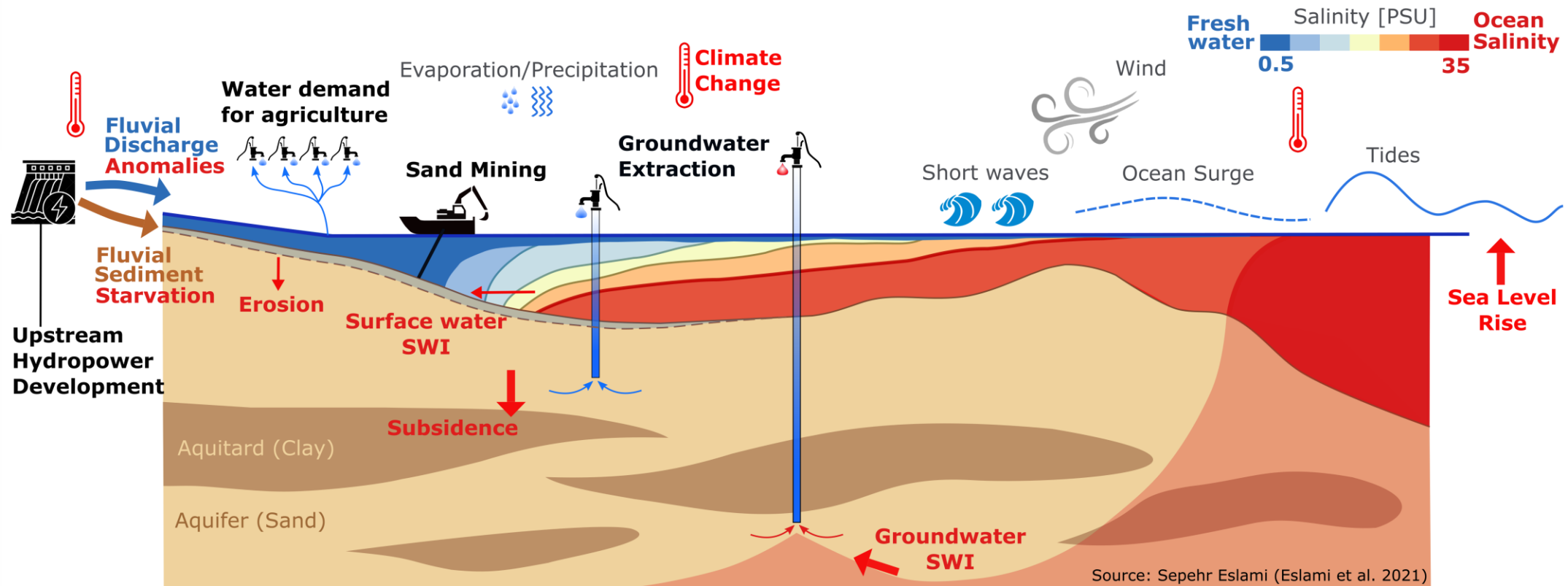


Sunrise is pictured over the Mekong River on the outskirts of Phnom Penh on 1 June, 2020. (AFP Photo)

Water levels in Southeast Asia's largest river may be at its lowest in a century.

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The Mekong Deltaic System



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The Displaced: When 40,000 people hit a tiny island

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Five ways to be climate change resilient

🕒 10 Sep

BBC

Ashley John-Baptiste

REPORTER



But due to climate change there have been some drastic changes, forcing people to leave.

The Displaced: Climate change in Vietnam 'destroying family life'

Vietnam is one of the world's most vulnerable countries to climate change.

It's already having a huge impact on the lives of those in the Mekong Delta, the agricultural heartland of the country and home to 20% of the country's population.

Ashley John-Baptiste went to meet the families living on the front lines of climate change.

In 2018 - more than 35,000 people were forced to flee their homes every day - that's one every two seconds.

This story is part of a BBC News series, called "The Displaced" - a selection of stories exploring the human impact of this movement, and how it is changing our world.

If you have been affected by the issues in this series and would like to speak to the BBC, email haveyoursay@bbc.co.uk

Video by Olivia Lace-Evans

🕒 30 Sep 2019

Climate Change in the Mekong


nature climate change

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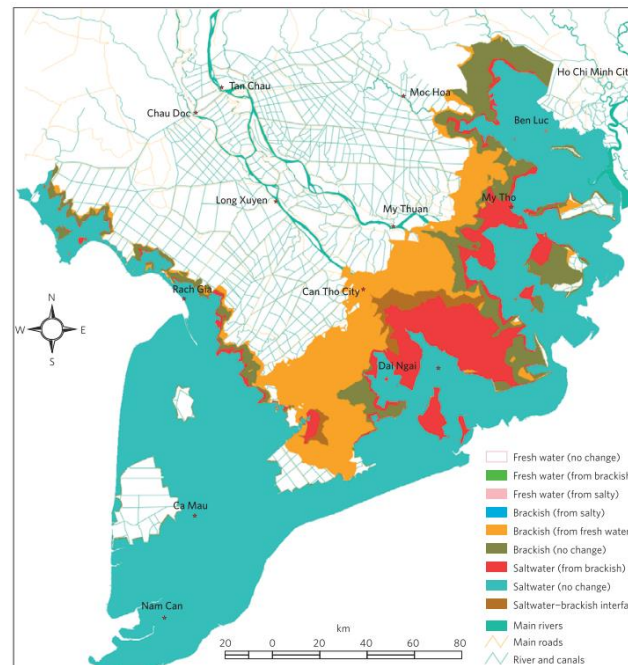
nature > nature climate change > articles > article

Published: 12 January 2015

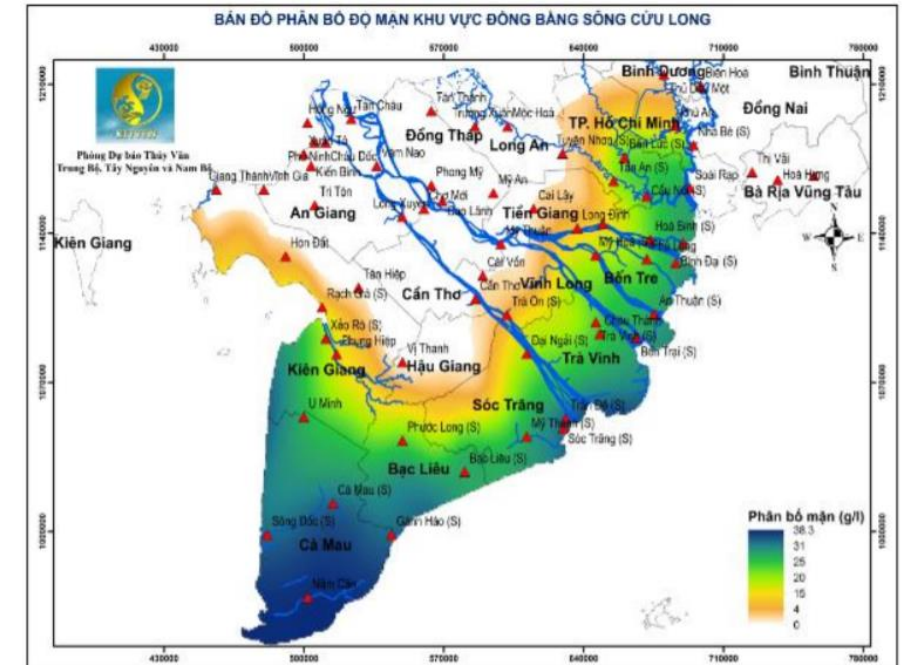
Responding to rising sea levels in the Mekong Delta

A. Smajgl , T. Q. Toan, D. K. Nhan, J. Ward, N. H. Trung, L. Q. Tri, V. P. D. Tri & P. T. Vu

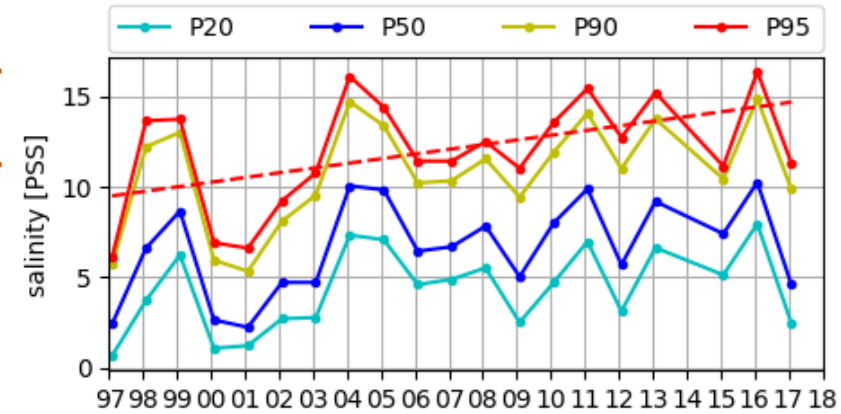
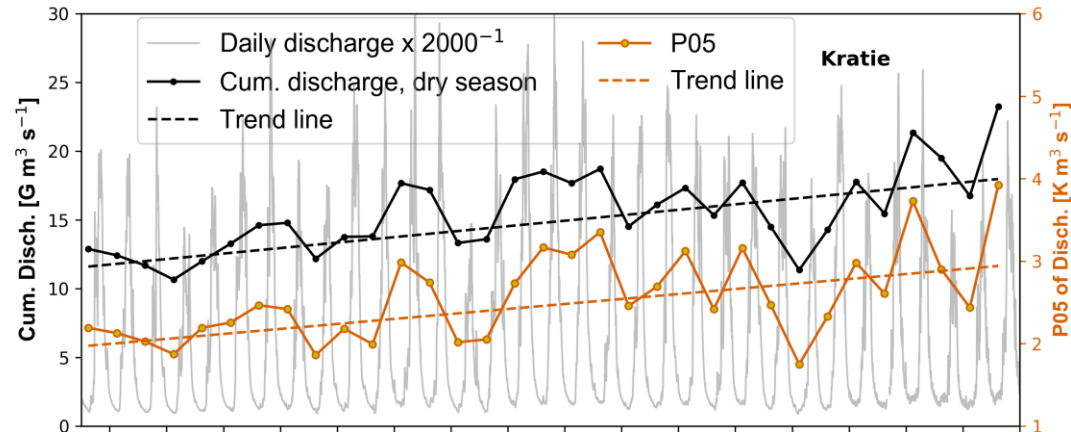
2015 for 2050



2016

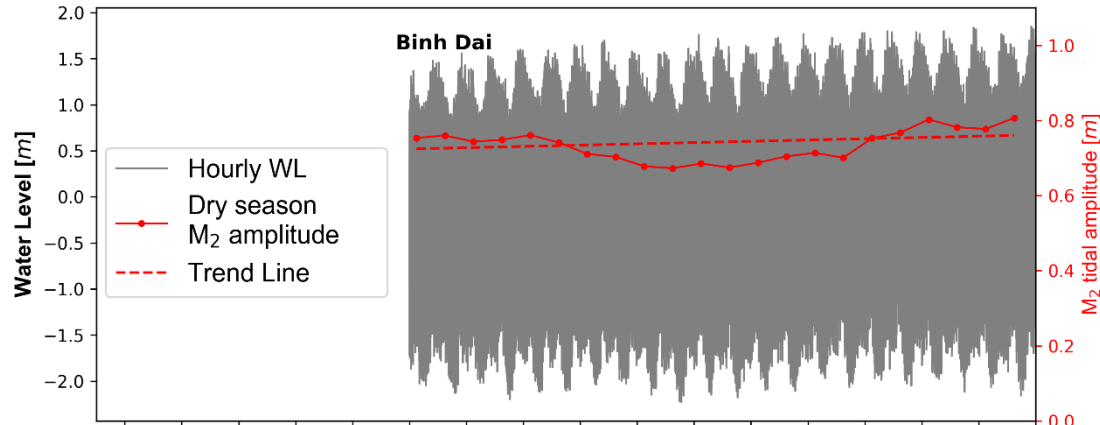


~~Fresh water inflow?~~



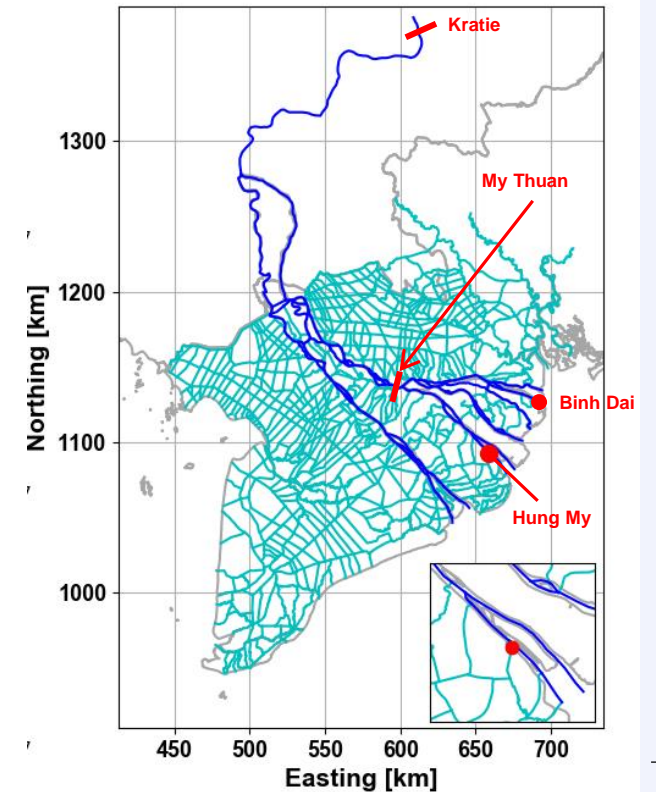
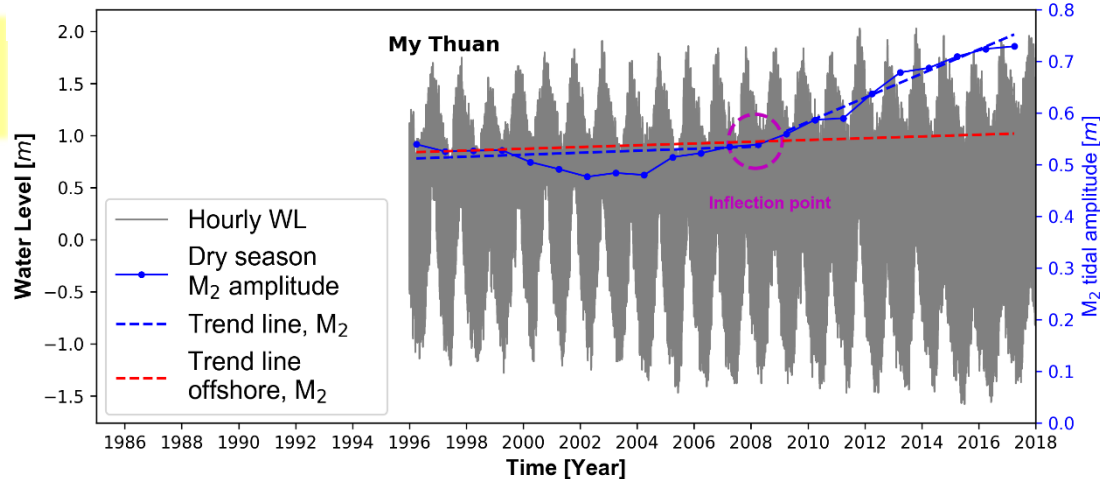
?

Ocean Forces



✓

Tidal Signal Within the delta?





The Displaced: Climate change in Vietnam 'destroying family life'

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If you have been affected by the issues in this series and would like to speak to the BBC, email haveyoursay@bbc.co.uk

Video by Olivia Lace-Evans

🕒 30 Sep 2019



The Displaced: Climate change in Vietnam 'destroying family life'

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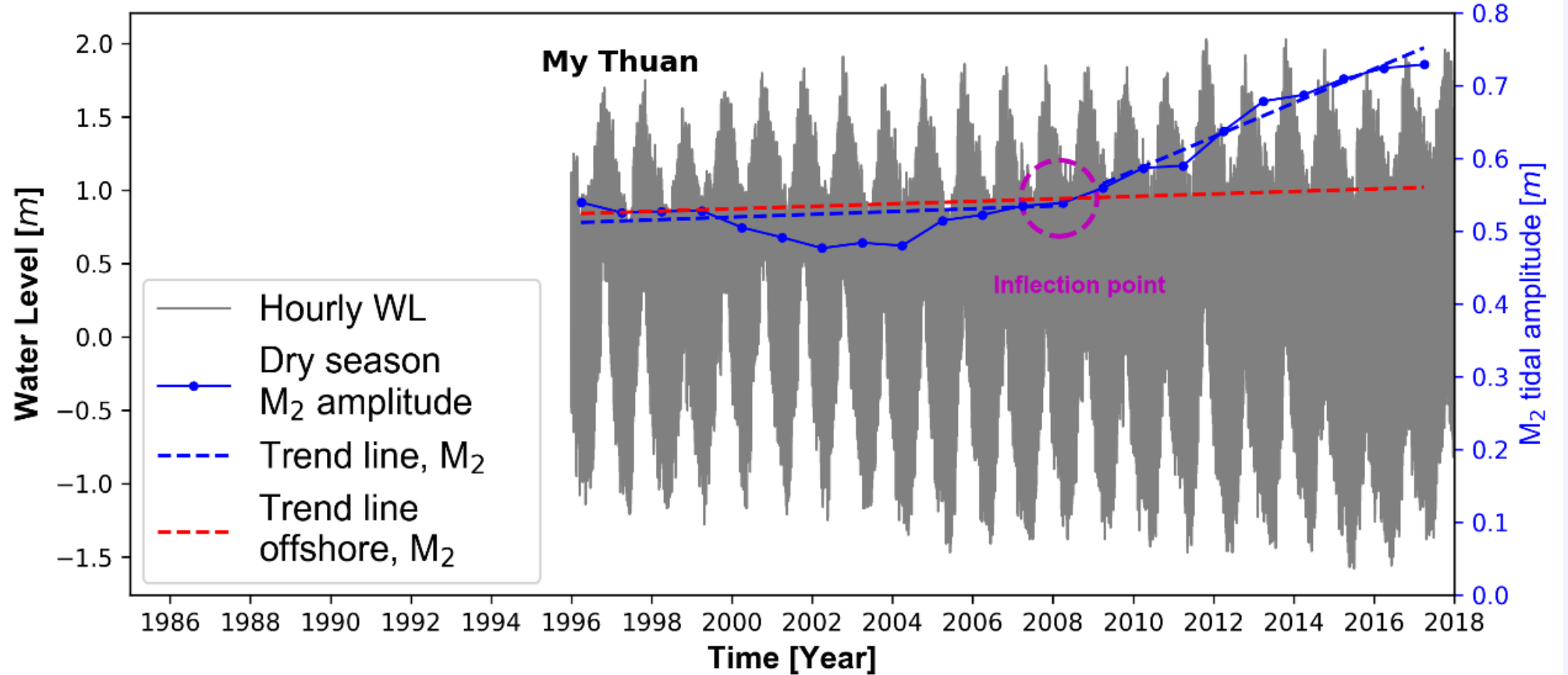
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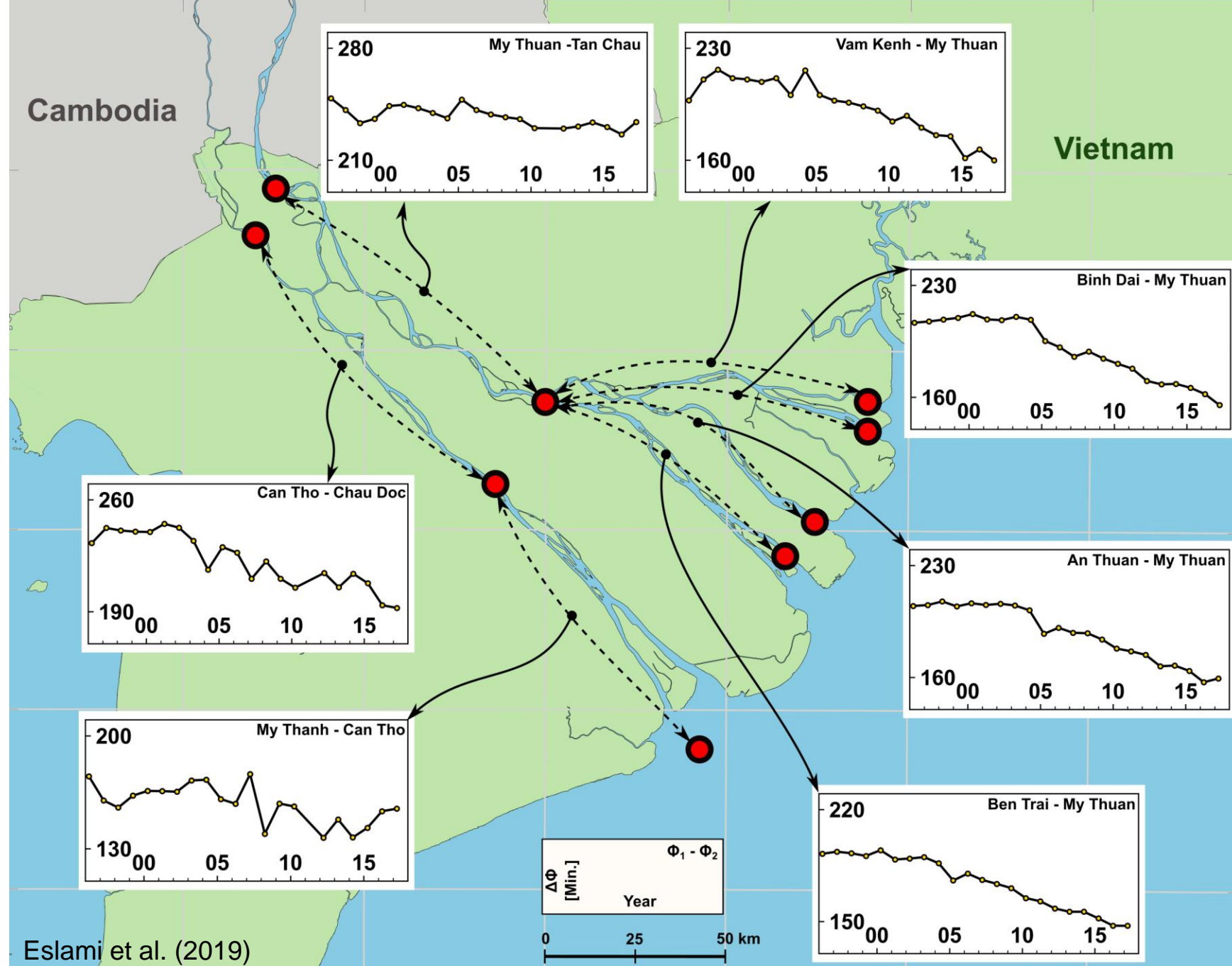


- Salt intrusion
- Higher WL & city flooding
- Bank erosion

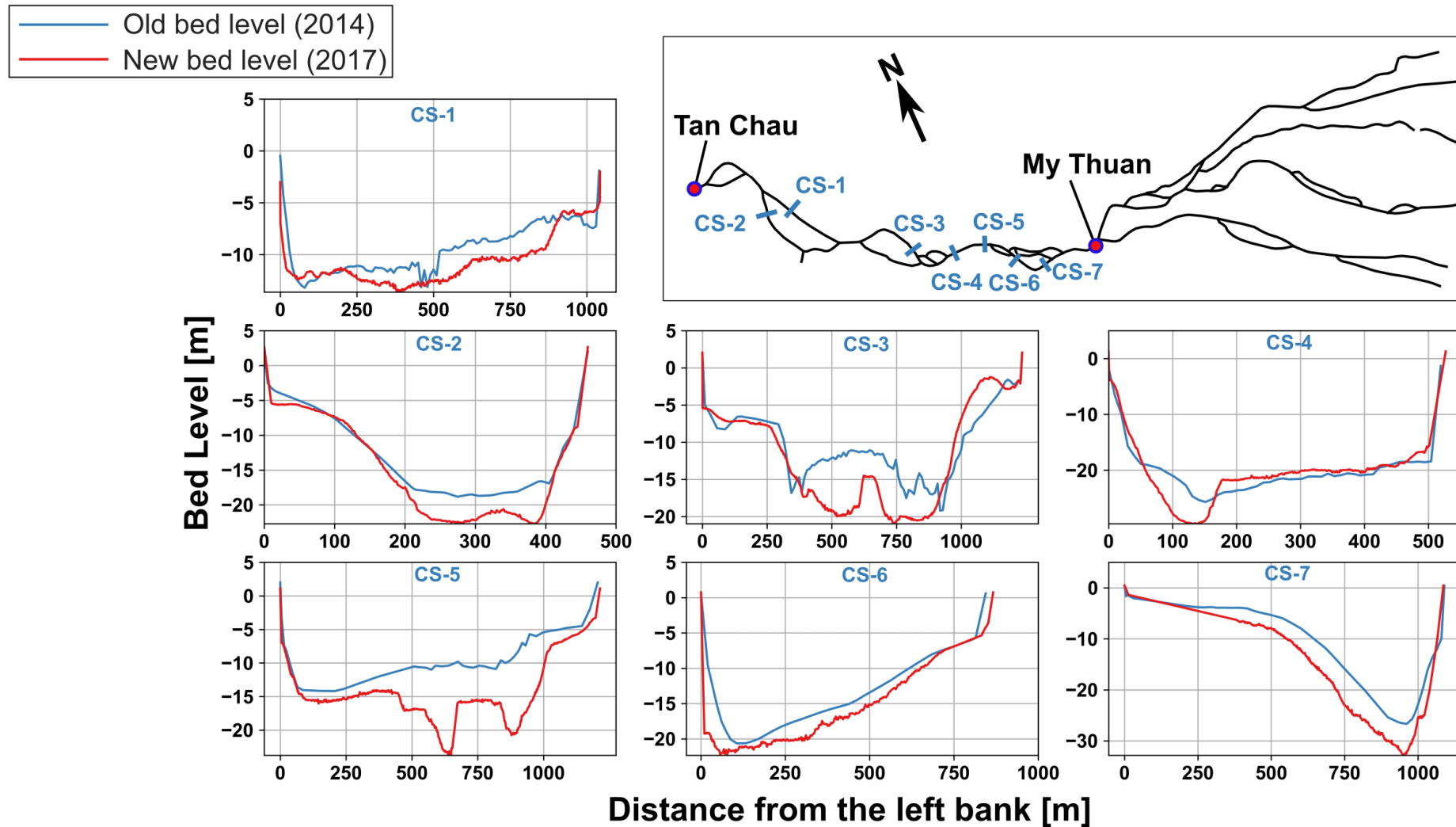
$$\text{Tidal travel speed} = \sqrt{g \times \text{depth}}$$

On average:
~2-3m deeper channels

Recently validated by
Vasilopoulos et al. (2020)



Examples of bed level changes



~~Climate Change in the Mekong~~ Environmental


scientific reports

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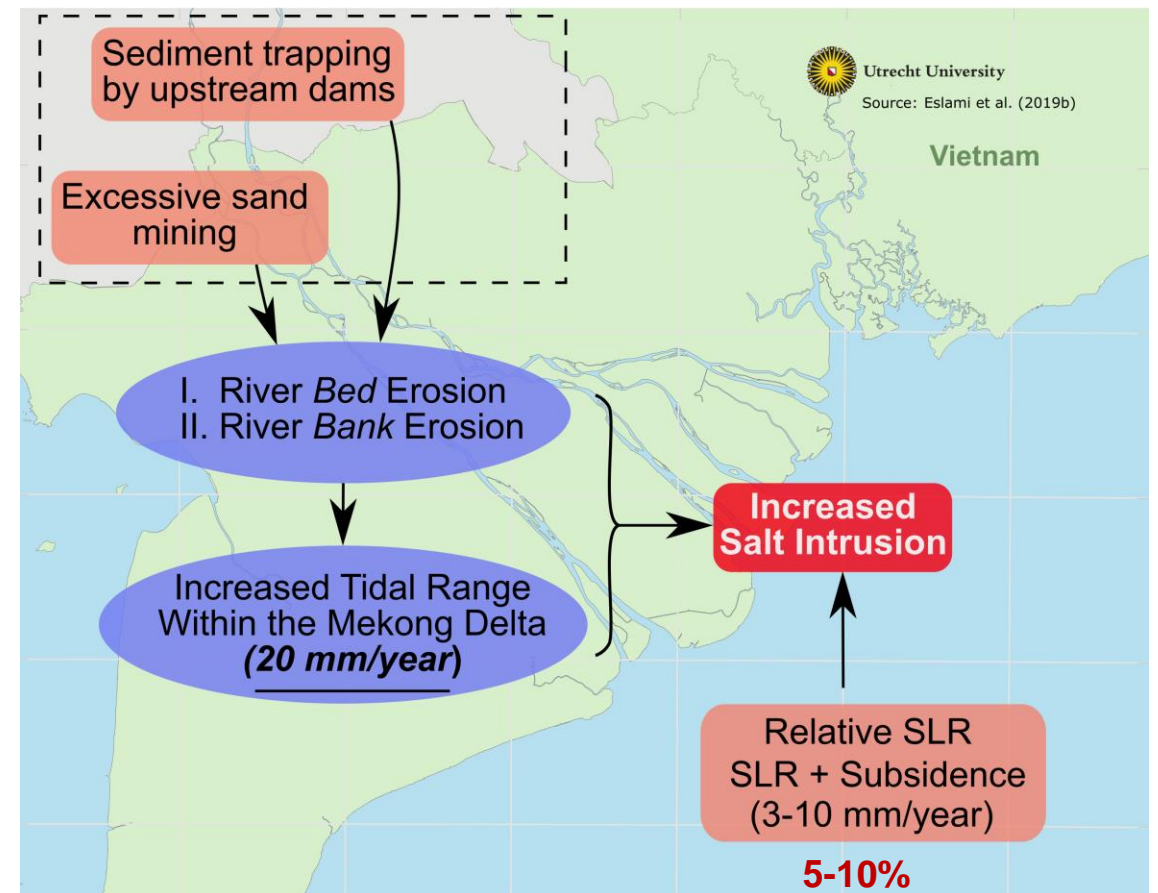
nature > scientific reports > articles > article

Article | [Open Access](#) | Published: 10 December 2019

Tidal amplification and salt intrusion in the Mekong Delta driven by anthropogenic sediment starvation

Sepehr Eslami , Piet Hoekstra, Nam Nguyen Trung, Sameh Ahmed Kantoush, Doan Van Binh, Do Duc Dung, Tho Tran Quang & Maarten van der Vegt

- **Salt intrusion**
- **Higher tides**
- **City flooding**
- **Bank erosion**



Integrated approach

Coastal - Inland

Upstream - Downstream

Climate Change - Anthropogenic



Upstream Discharge

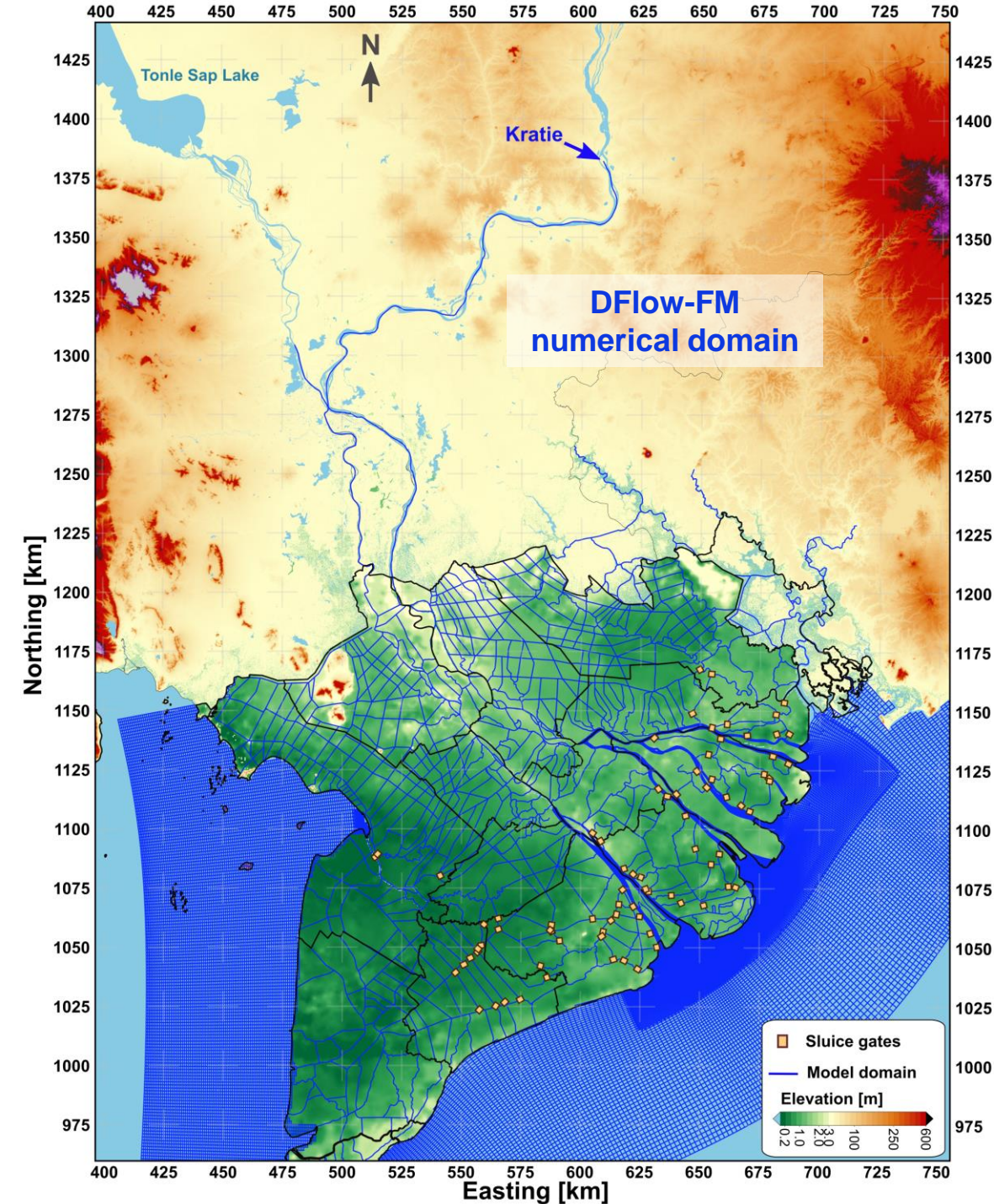


Subsidence

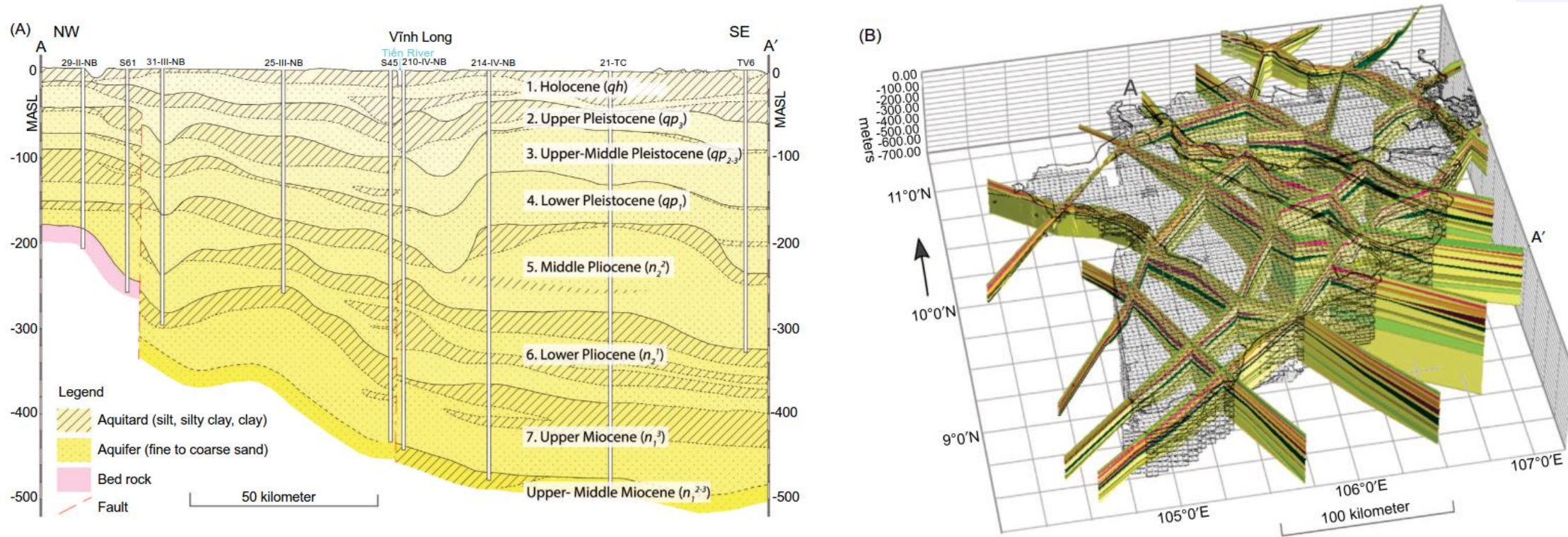
Downstream SLR

Erosion

Surface water - Groundwater

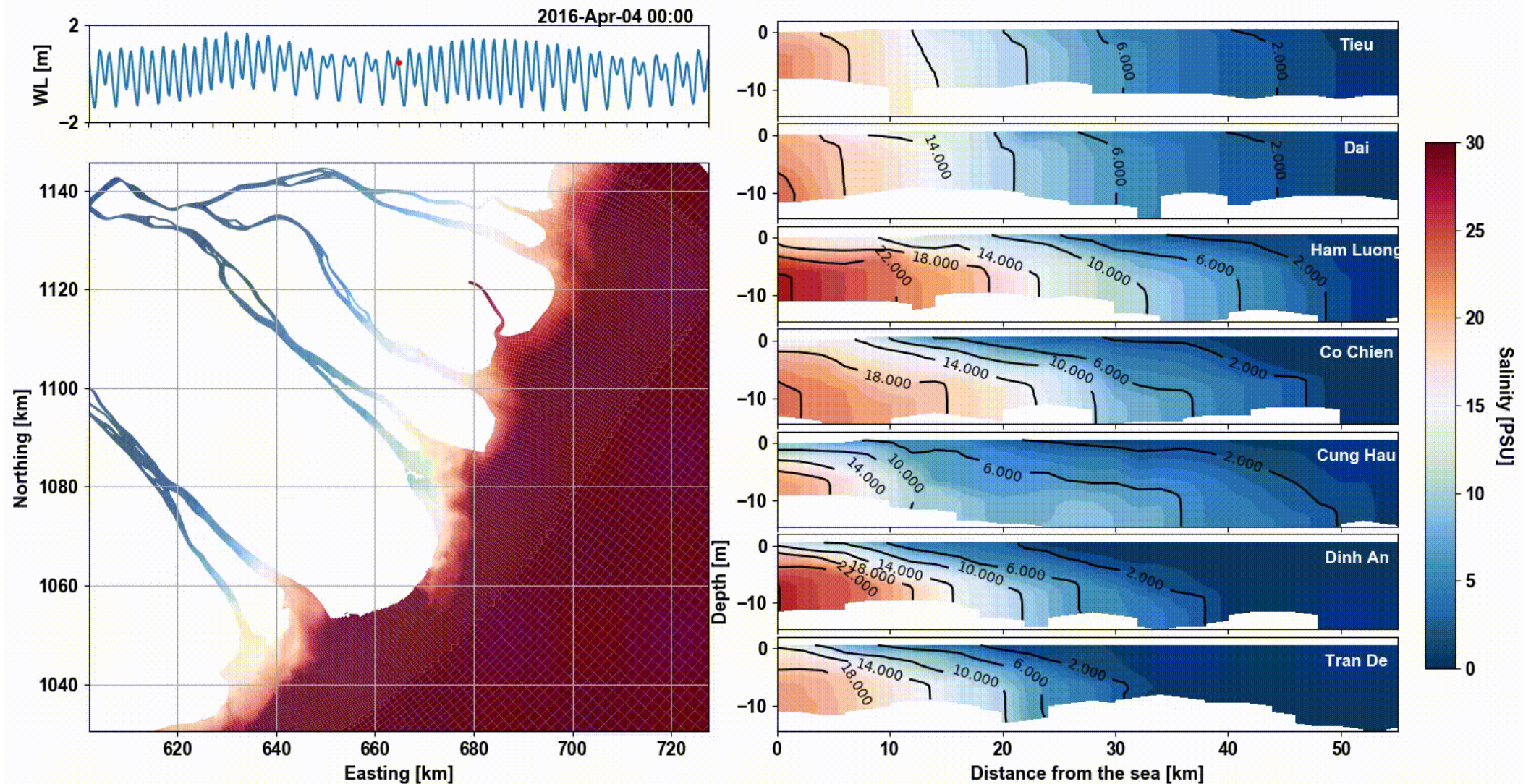


3D Groundwater and Geological Modelling



Source: Minderhoud et. al (2017)

3D Surface water modelling

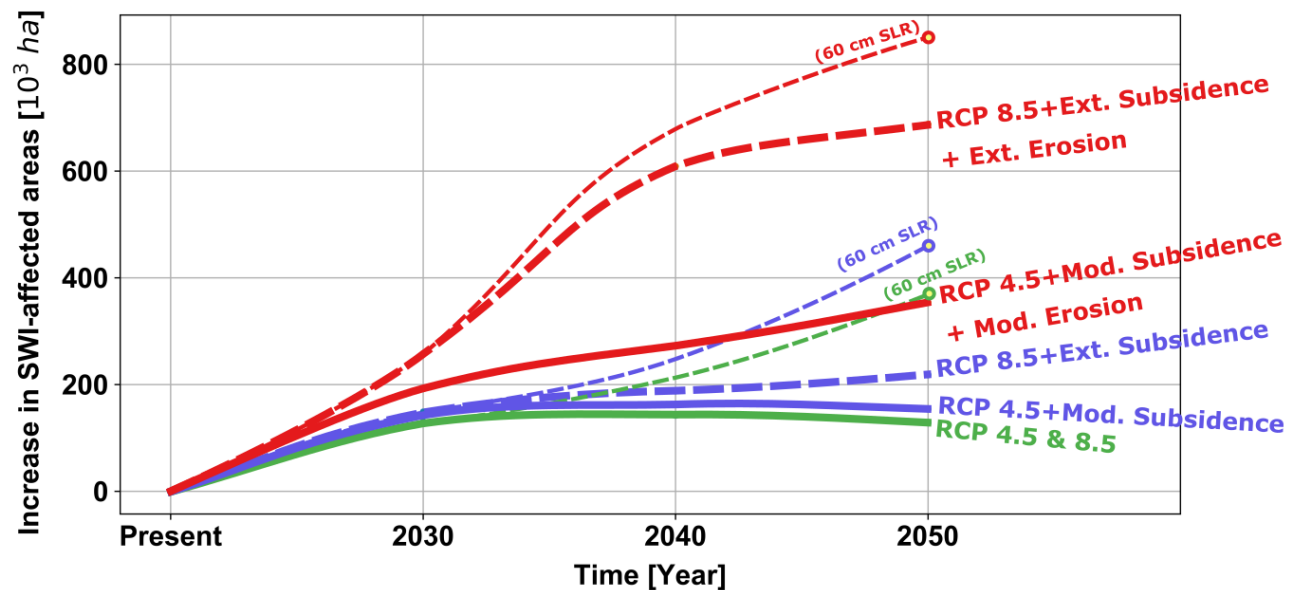


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Eslami et. al (in prep. 2020)

Environmental pathways

Extent of salt intrusion in the delta



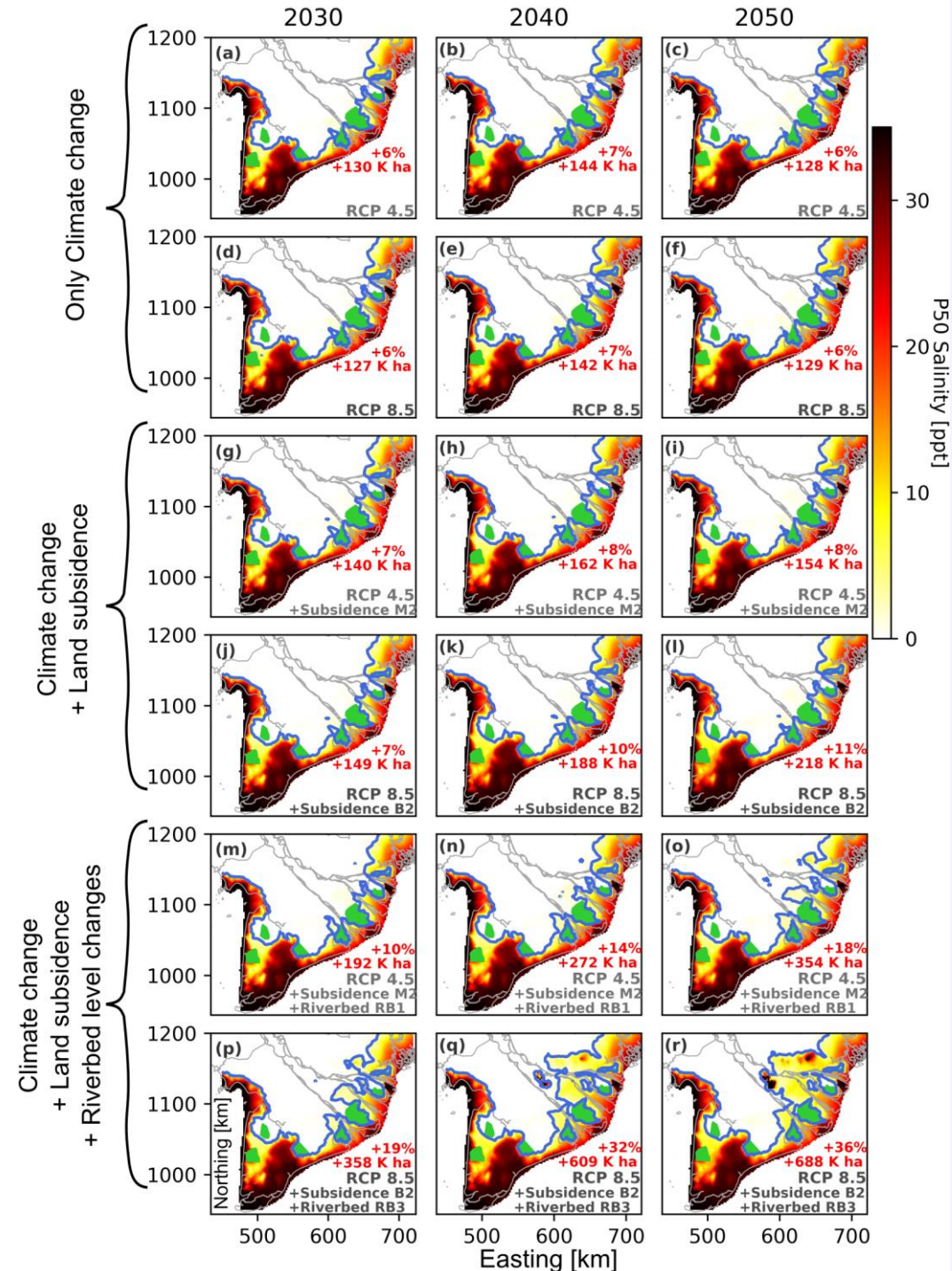
Eslami et al. (2021a & b)

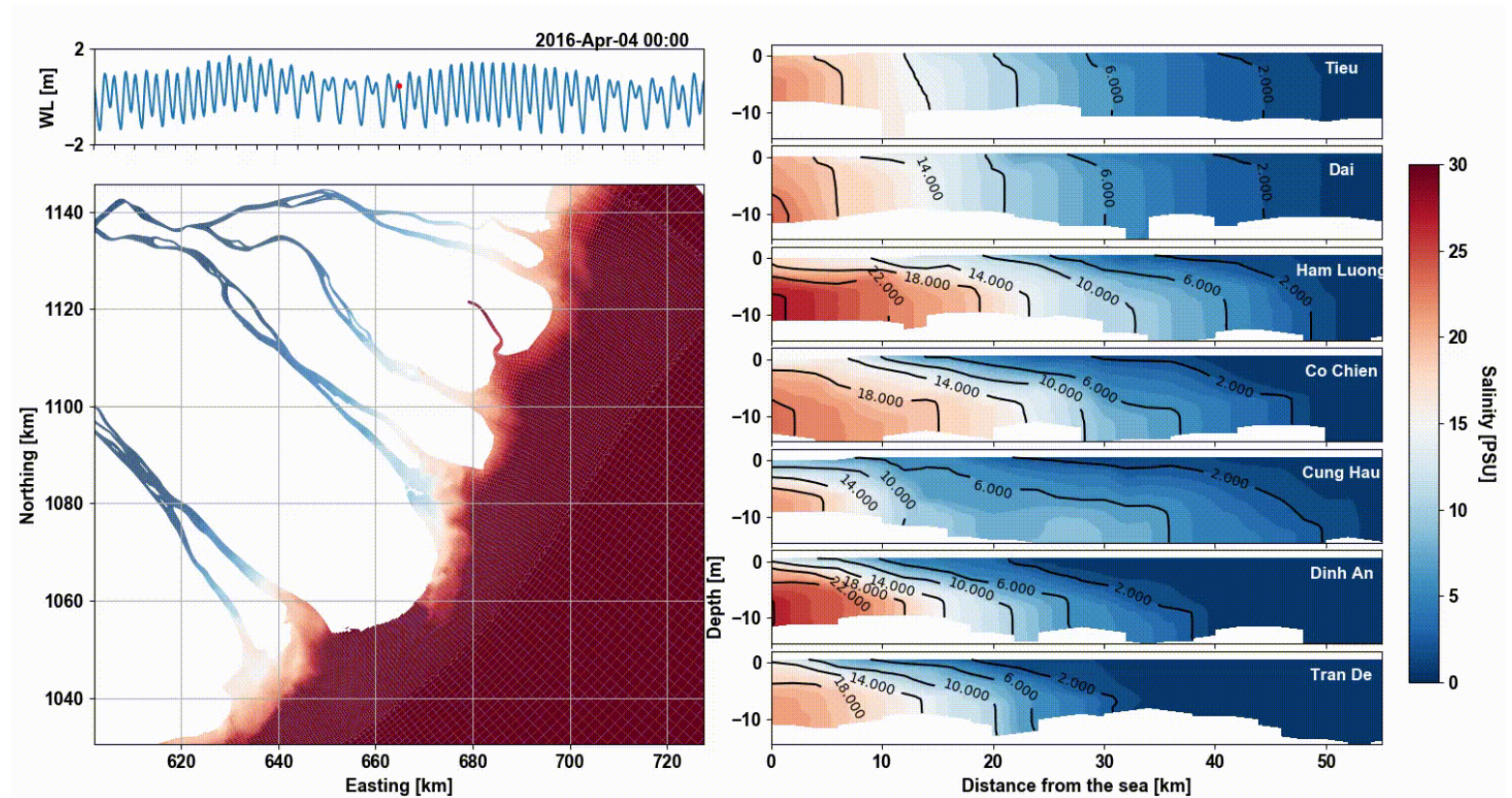
“Projections of salt intrusion in a mega-delta under climatic and anthropogenic stressors “, Nature Communications Earth & Env.

 sepehr.eslamiarab@deltares.nl

 @Sepehr_eslami

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✉ sepehr.eslamiarab@deltares.nl

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