

# EIDEIC 2020

(TENTATIVE PhD TITLE)

## Climate variability of flooding in coastal populated areas affected by tropical cyclones

Author: Sara Ortega van Vloten

Directors: Fernando J. Méndez Incera  
Ana C. Rueda Zamora



# MOTIVATION

- Opportunity to work in interesting projects within the research Group of Geomatic and Oceanographic Engineering



- Personal interest to further knowledge and expertise within the current research field
- To develop skills and capabilities

# COASTAL FLOODING DUE TO TCs

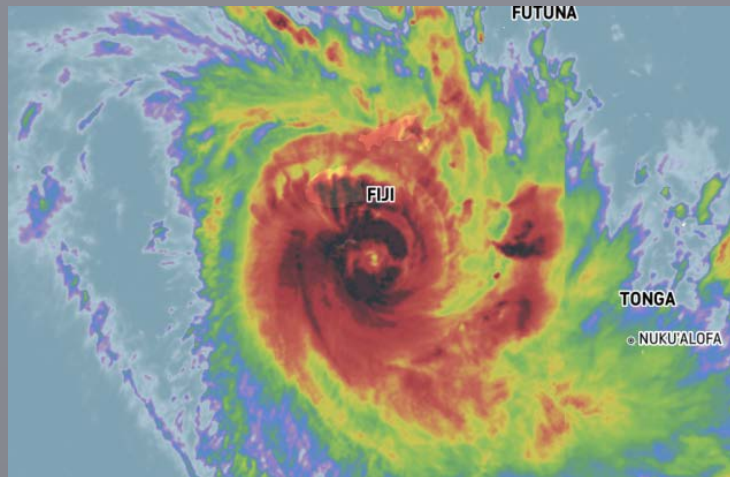


**COMPOUND EVENT:** *The combination of multiple statistically dependent variables or events that lead to an extreme impact*



## HAROLD TC (April 2020)

TC track  
Min. pressure  
Max. winds



Intense rainfall

**Extreme flooding impact**

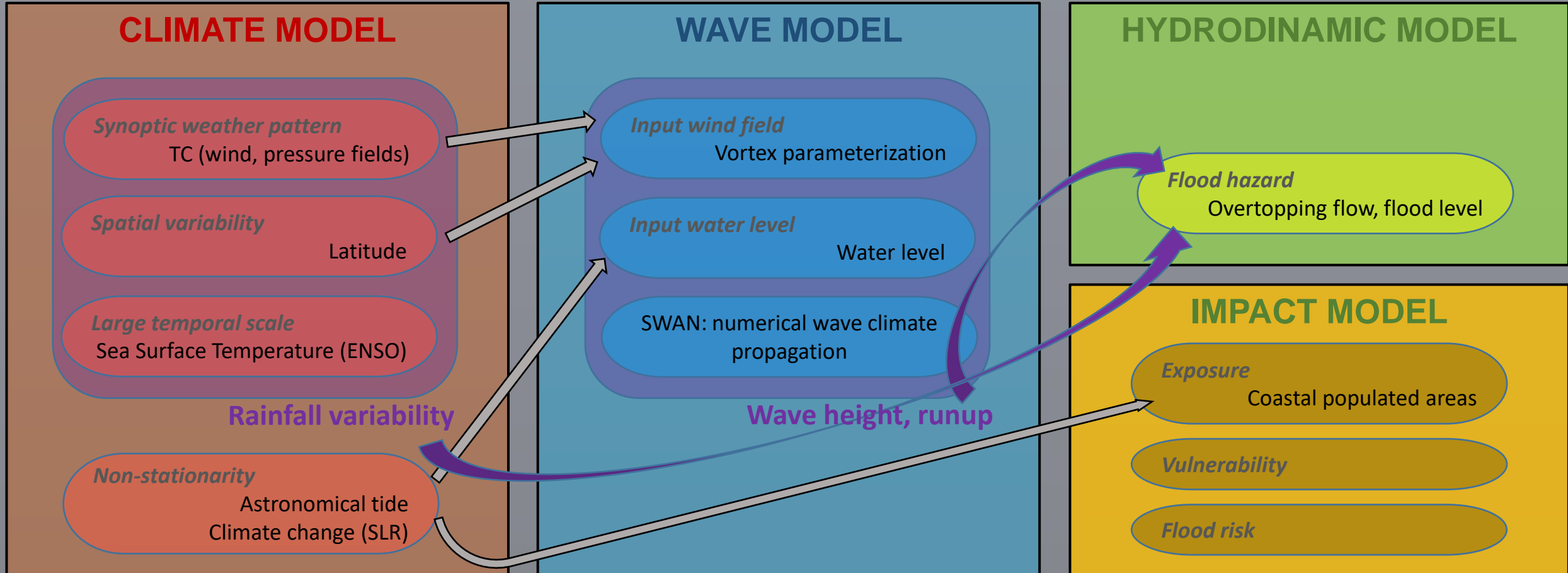


# COASTAL FLOODING DUE TO TCs



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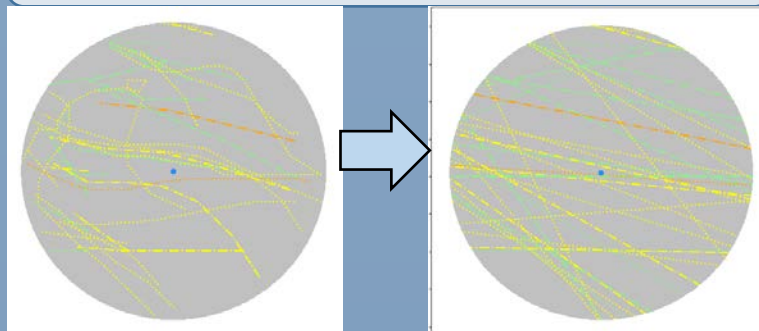
## MULTIVARIATE Problem Diagram



# WAVE MODEL: wave climate emulator

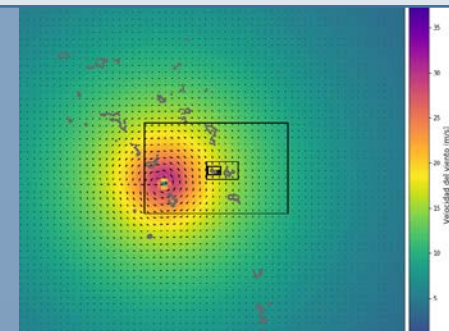
Metamodel to estimate wave conditions from TC parameters

A) Track parameterization



+

B) Wind field parameterization



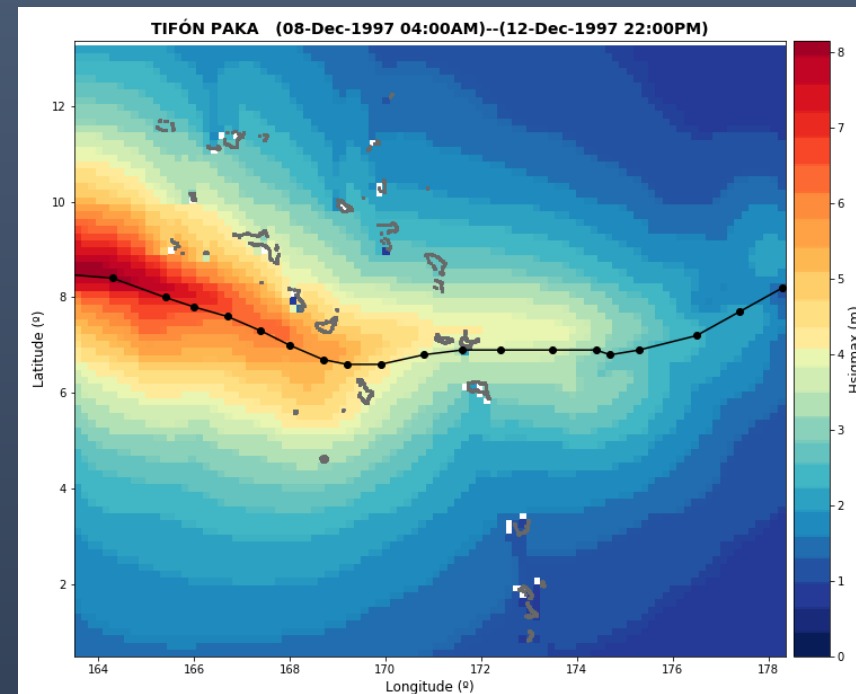
+

Hybrid downscaling  
(save computational cost)

Clustering selection (MaxDiss)  
from synthetic TC database

Extreme wave  
climate

*Historical TC  
simulation  
results*



# CLIMATE MODEL: rainfall variability analysis

Historical analysis of statistical dependent climate variables

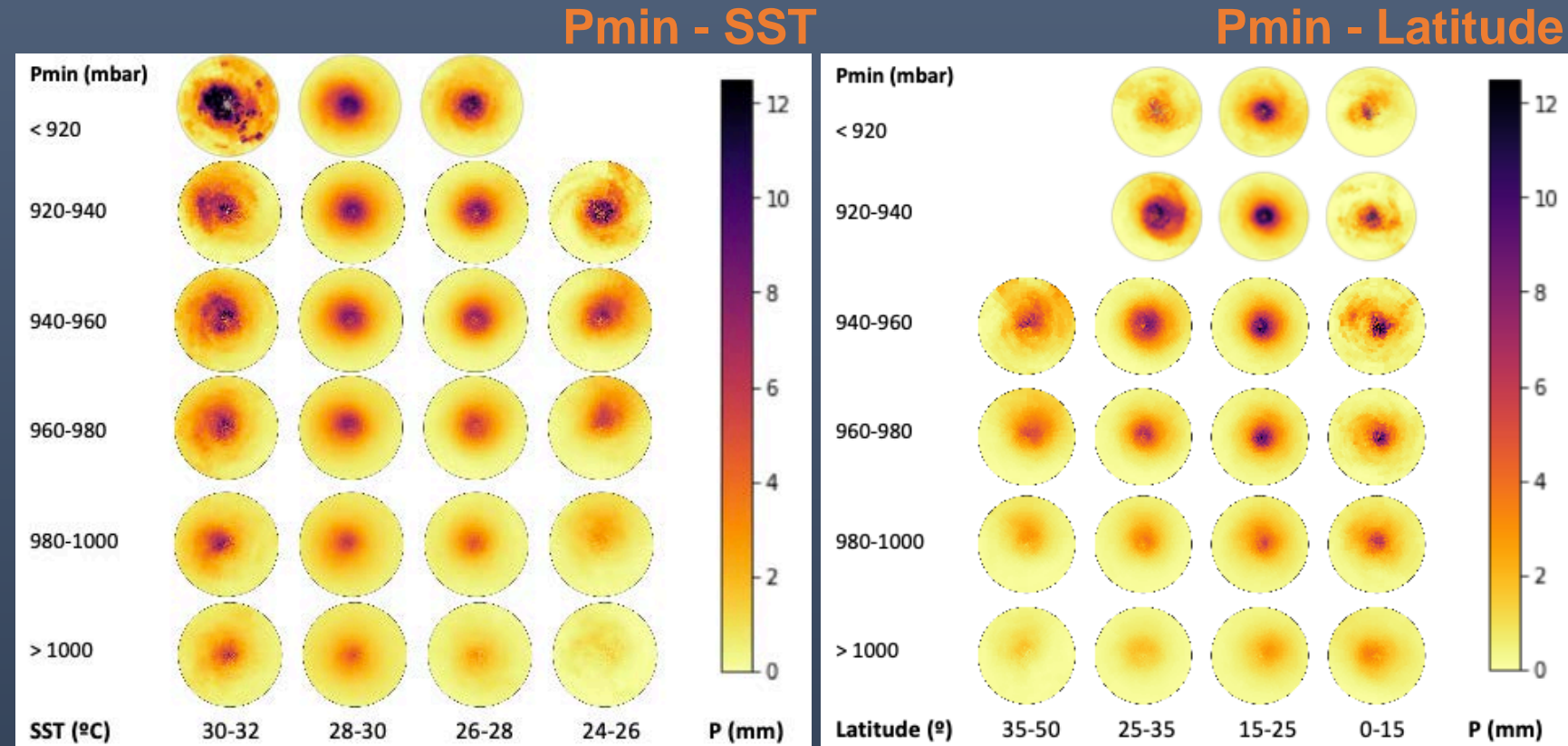


JOINT PROBABILITY DISTRIBUTIONS PARAMETERIZATION

Discretization analysis

- basin,
- seasonality,
- frequency,...

Some examples:



# FIRST RESEARCH PLAN

- A. Science: state of the art, literature review
- B. Technology: programming language (PYTHON), numerical model (SWAN)
- C. Activities: multidisciplinary training by EDUC

## Research progress:

- Historical tropical cyclone database analysis
- Validation of vortex model parameterization
- Wave climate model testing

**Thanks for your attention**