SnT 2025
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE

Environmental Variation Impacts on the International Monitoring System

Michael Foxe, Ted Bowyer, Tara Goldberg, Michael Huh, Rachel Michaels, Annie Peddicord, Manish Sharma, Micah Taylor, Kelly Truax

Pacific Northwest National Laboratory

INTRODUCTION AND MAIN RESULTS

We have modeled 6 different hazards including flooding, cyclones, heat, precipitation, humidity, and dust, and assesses the impact of drought qualitatively. Findings were used to identify highly exposed stations, particularly damaging hazards, or cross-cutting trends in impacts.

With this, we have identified a subset of most likely to be impacted stations depending on the type of hazard.

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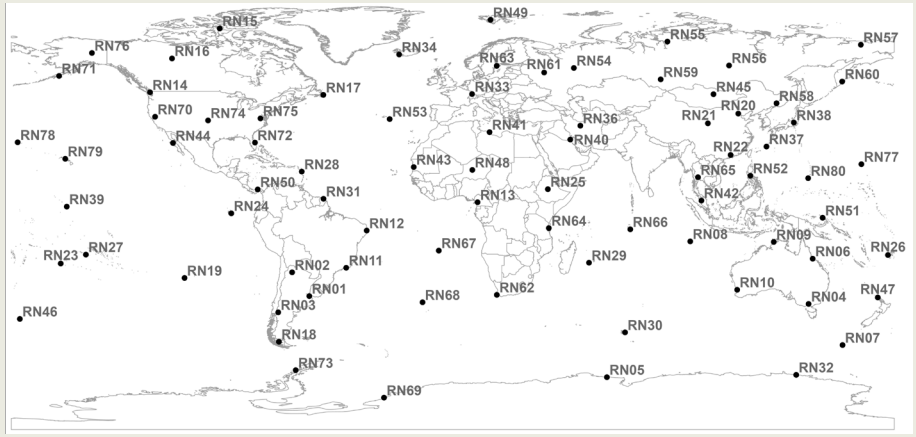
Introduction

Understanding how the environmental conditions and the long-term operation of IMS stations is important for the sustained verification regime.

We have modeled 6 different hazards including flooding, cyclones, heat, precipitation, humidity, and dust, and assesses the impact of drought qualitatively. Findings were used to identify highly exposed stations, particularly damaging hazards, or cross-cutting trends in impacts.

IMS Radionuclide Stations

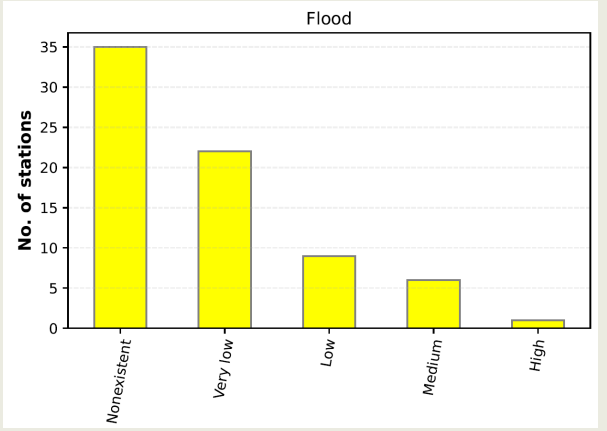


Environmental Variables and Impacts

Hazard	Sensor Impact	Approach/Data
Flooding	Electricity, Communications, Backup/Battery, Physical Integrity	WRI Aqueduct
Cyclones & High Winds	Electricity, Communication, Movement of Particles, Physical Integrity	Wind Risk Tech
Drought	Electricity/Grid Reliability	Qualitative case studies based on station report data
Heat	Backup/Battery, Sampling/Detection Equipment, Gamma-ray,	CMIP / World Bank
Precipitation	Sampling/Detection	CMIP / NASA
Humidity	Gamma-ray, Electrical Noise	CMIP / NASA
Dust	Clogging	Copernicus/Zhao et al

Flooding Impact

No. of stations	Altitude range (m)
61	0.0–302.0
5	302.0–604.0
1	604.0–906.0
1	906.0–1208.0
1	1208.0–1510.0
3	1510.0–1812.0
1	2718.0–3020.0



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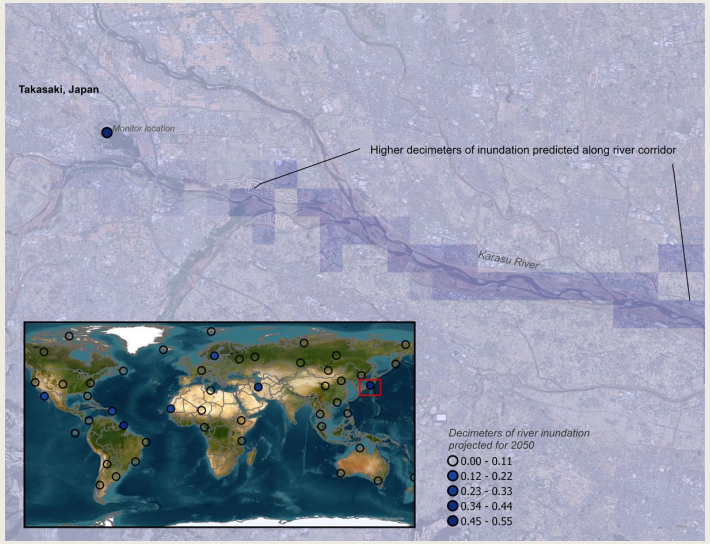
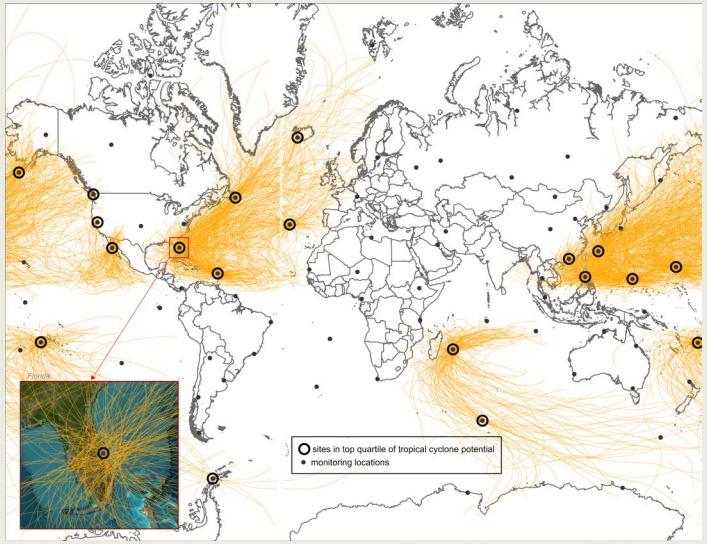
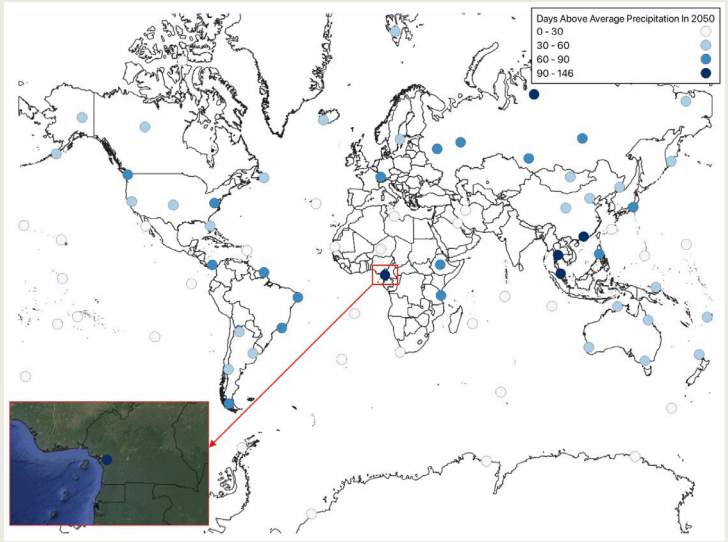
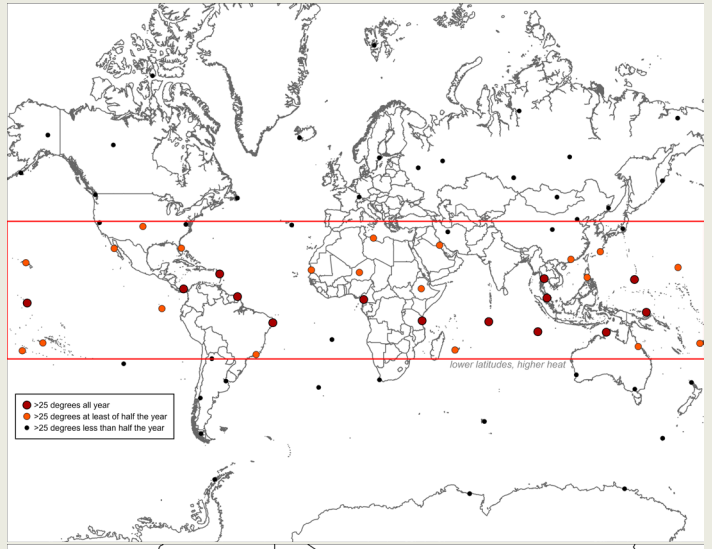


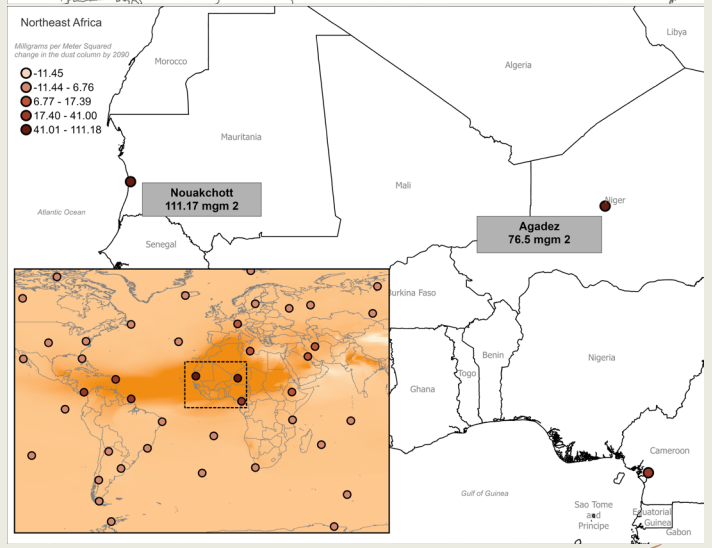
Potential Impacts on IMS Stations

Hazard	Greatest Exposures
Riverine Flooding (top left)	Japan
Coastal Flooding	None
Cyclones (bottom left)	Florida, Coastal US, US islands, Mexico, Pacific Islands
Heat (top right)	Equatorial Stations
Precipitation (bottom middle)	Cameroon, Southeast Asia
Humidity	Russia, Chile, Argentina, South America, Asia, North America
Dust (bottom left)	Niger, Mauritania









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