



# IRDR efforts on climate change and disaster risk reduction

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# Vision, Mission and Objectives

***Toward inclusive, safe and sustainable development***



**Improve**  
knowledge and  
understanding of  
risk and  
uncertainty



**Promote**  
innovation in  
research and action,  
and explore  
effective solutions  
in DRR



**Build**  
institutional  
capacity required  
for risk-informed  
development

# Research Priorities in the new Framework

1. Understand risk creation and perpetuation in the present risk landscape
2. Address inequalities, injustices and marginalisation
3. Enable transformative governance and action
4. Understand the implications of new thinking on hazards
5. Harness technologies, data and knowledge for risk reduction
6. Support regional and national science and knowledge for policy and action
7. Support just and equitable transitions, adaptation and risk reduction
8. Measurement to help drive progress
9. Foster interdisciplinary and multi-stakeholder collaboration



# Understanding climate change and its systemic, cascading risk

- **Hazard definition and classification**
- Risk patterns and landscape
- Climate change and health
- Climate-related disaster risk assessment
- Climate change and food security
- ...



# Hazard definition and classification

## 2014 IRDR Peril Classification and Hazard Glossary

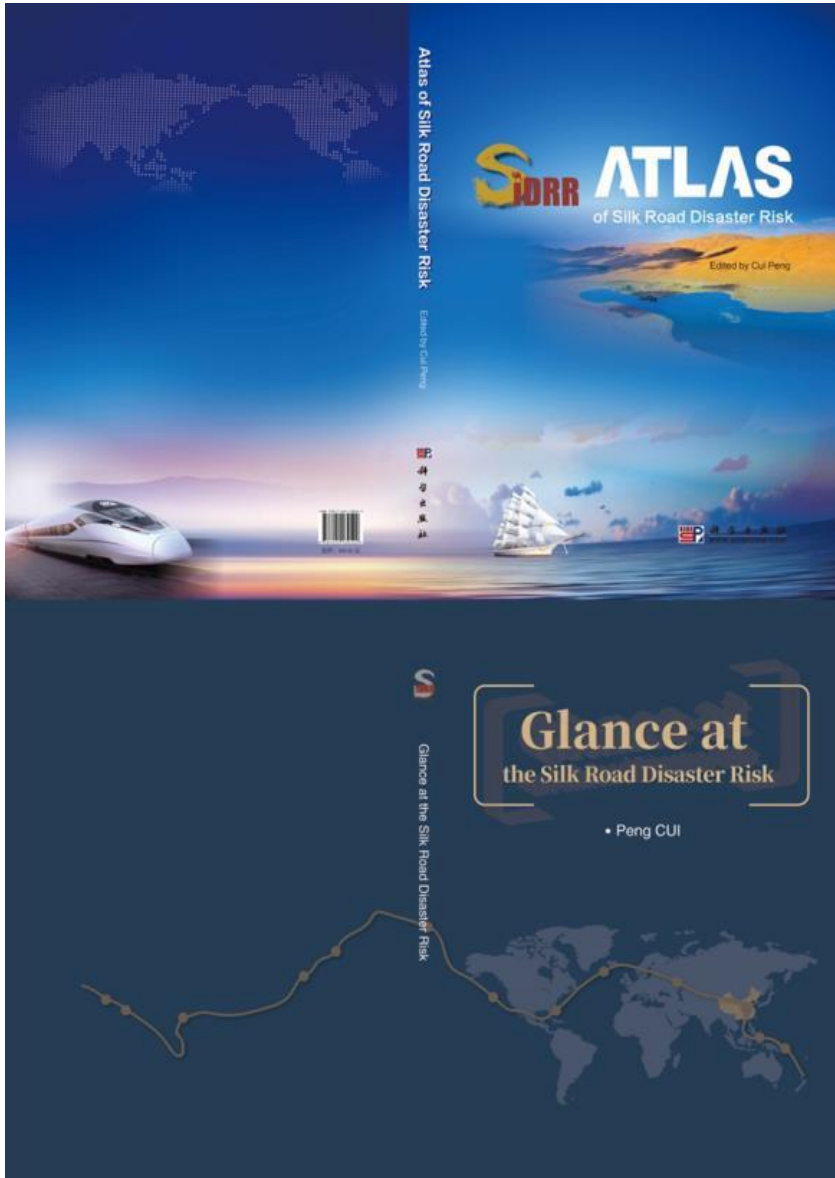
- The number of hazard types increases
- Connecting meteorological hazards to hydrological hazards

Family	Main Event	Peril	
Meteorological	Convective Storm Extratropical Storm Extreme Temperature Fog Tropical Cyclone	Cold Wave Derecho Frost/Freeze Hail Heat Wave Lightning Rain	Sandstorm/Dust storm Snow/Ice Storm Surge Tornado Wind Winter Storm/Blizzard

## 2021 UNDRR-ISC Hazard Classification (IRDR contributed to)

Type	Cluster	Specific Hazard			
Meteorological and Hydrological	Convective-Related Flood Lithometeors Marine Pressure-Related Precipitation-Related Temperature-Related Terrestrial Wind-Related	Downburst Lightning (Electrical Storm) Thunderstorm Coastal Flood Estuarine (Coastal) Flood Flash Flood Fluvial (Riverine) Flood Groundwater Flood Ice-Jam Flood Including Debris Ponding (Drainage) Flood Snowmelt Flood Surface Water Flooding Glacial Lake Outburst Flood Black Carbon (Brown Clouds) Dust storm or Sandstorm Fog Haze Polluted Air Sand haze	Smoke Ocean Acidification Rogue Wave Sea Water Intrusion Sea Ice (Ice Bergs) Ice Flow Seiche Storm Surge Storm Tides Tsunami Depression or Cyclone (Low Pressure Area) Extra-tropical Cyclone Sub-Tropical Cyclone Acid Rain Blizzard Drought Hail Ice Storm	Snow Snow Storm Cold Wave Dzud Freeze Frost (Hoar Frost) Freezing Rain (Supercooled Rain) Glaze Ground Frost Heatwave Icing (Including Ice) Thaw Avalanche Mud Flow Rock slide Derecho Gale (Strong Gale) Squall	Subtropical Storm Tropical Cyclone (Cyclonic Wind, Rain [Storm] Surge) Tropical Storm Tornado Wind

# Understanding the patterns and landscapes

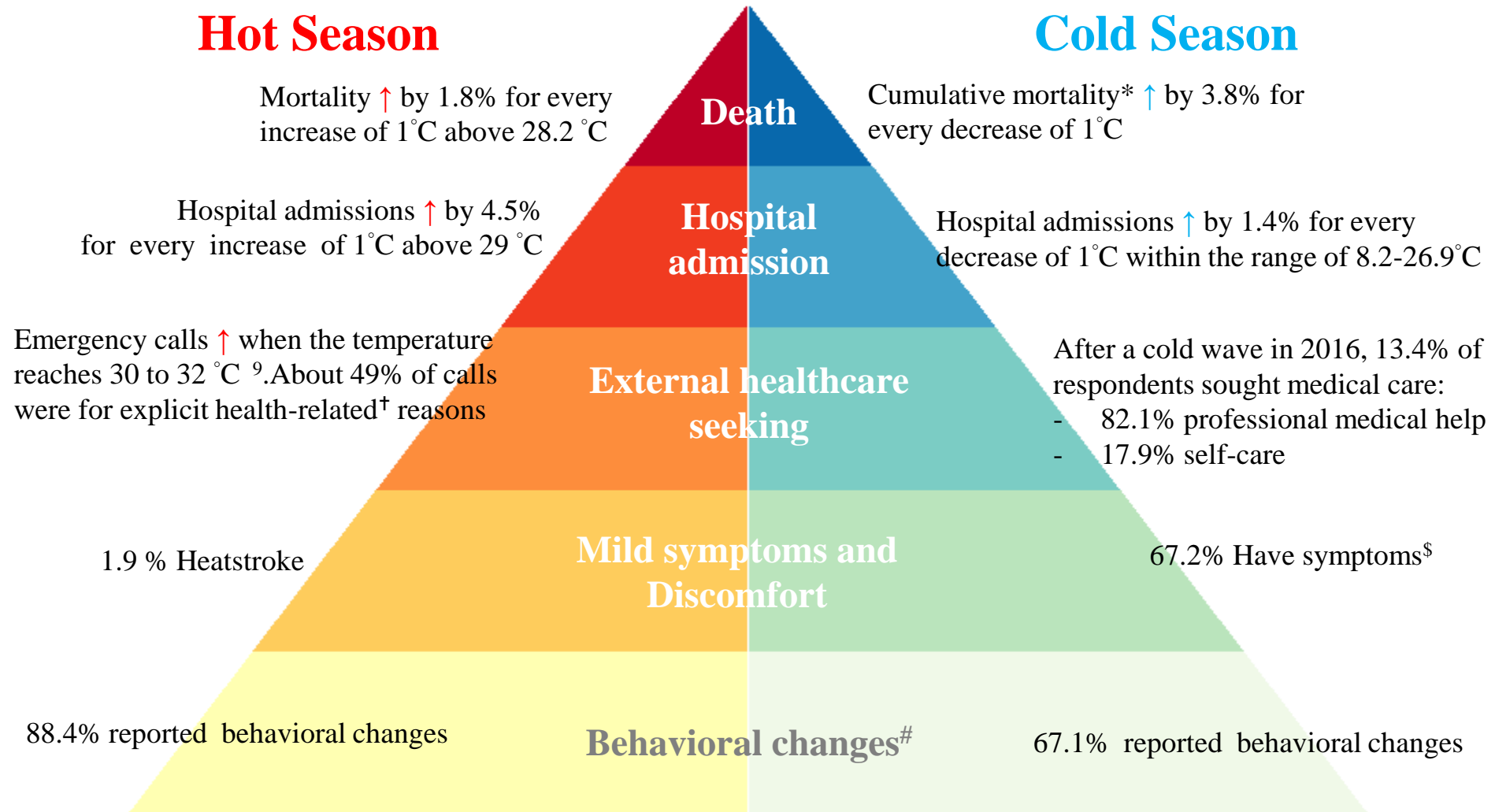


Silk Road Disaster Risk  
-by IRDR Flagship project  
“SiDRR”

Risk Atlas of Colombia  
-by IRDR NC-Colombia



Figura 18. Regiones preferenciales, trayectorias y estaciones para el desarrollo de ciclones tropicales (<https://www.nhc.noaa.gov/clmo/>)



# Support regional and national science and knowledge for policy and action

- Multi-hazard early warning system
  - National Multi-Hazard Early Warning Centre
  - Kuala Lumpur Multi-Hazard Platform
  - The first machine learning forecasting system
- Trends and future priorities in the field of climate change and health
- ...





# Multi-hazard Early Warning System

Model and concept provided by IRDR SC Member:  
Bapon S.H.M FAKHRUDDIN

## EW4All



Project promoted by UNDRR:  
<https://www.irdrinternational.org/news/921>

## Multi-Hazard Impact Based Early Warning System

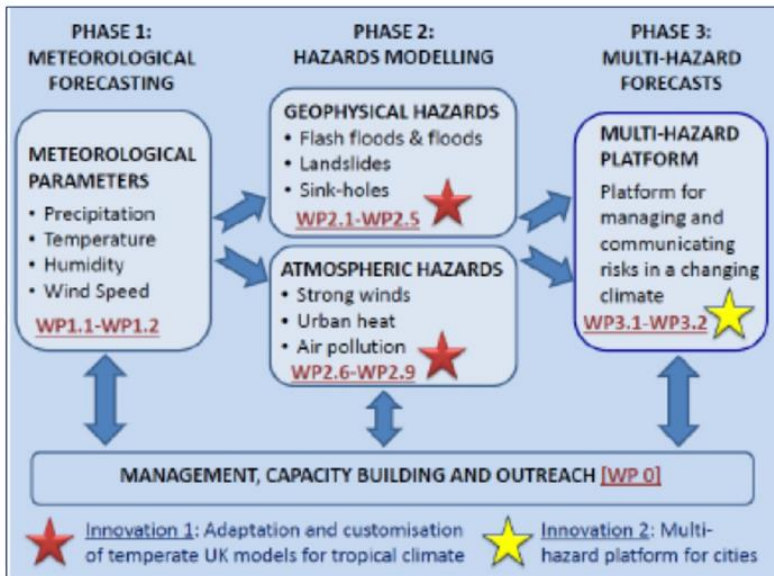


# Multi-hazard Early Warning System

# Kuala Lumpur Multi-Hazard Platform (by IRDR ICoE UKM SEADPRI)

## MHP - A Multi-hazard Forecasting System for Cities

Innovate UK **MiGHT** Newton-Ungku Omar Fund

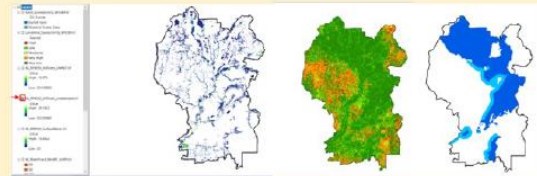


PROJECT LEADERS: Prof. Joy Jacqueline Pereira (SEADPRI-UKM) & Prof. Lord Julian C.R. Hunt (University Of Cambridge)

End-user 1: Emergency Response Squad in Cities



End-user 2: Landuse Planning & Development Control



Areas susceptible to flash floods, landslides and subsidence in GIS

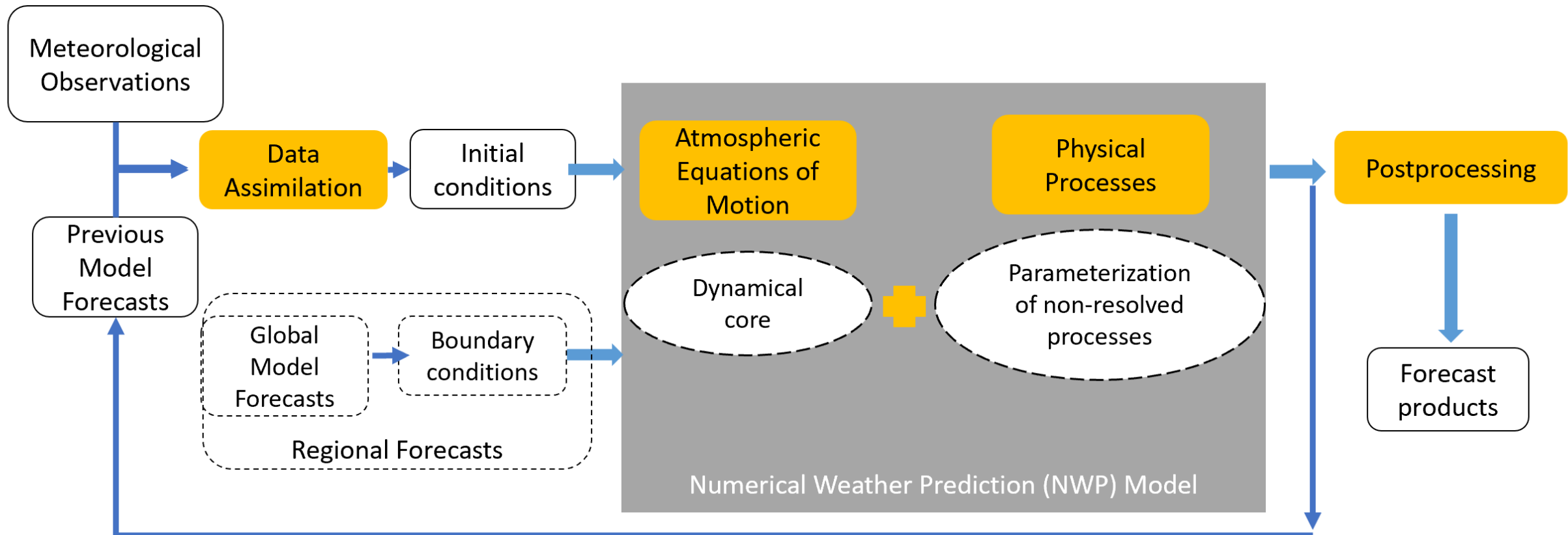
- The system starts with downscaling of climate parameters such as precipitation, temperature, humidity and wind-speed to provide threeday forecasts by the Meteorological Department of Malaysia.
- The primary end-user is the Emergency Squad in the City of Kuala Lumpur, who use these forecasts, to plan the deployment of their assets up to three days in advance of a flash-flood warning.
- The secondary user is the land-use planning and development control sections, who find information on areas susceptible to flash-floods, landslides and subsidence in GIS, useful for long-term planning to prevent disasters.

# Multi-hazard Early Warning System

by IRDR ICoE on Risk Interconnectivity and Governance

FuXi (伏羲):

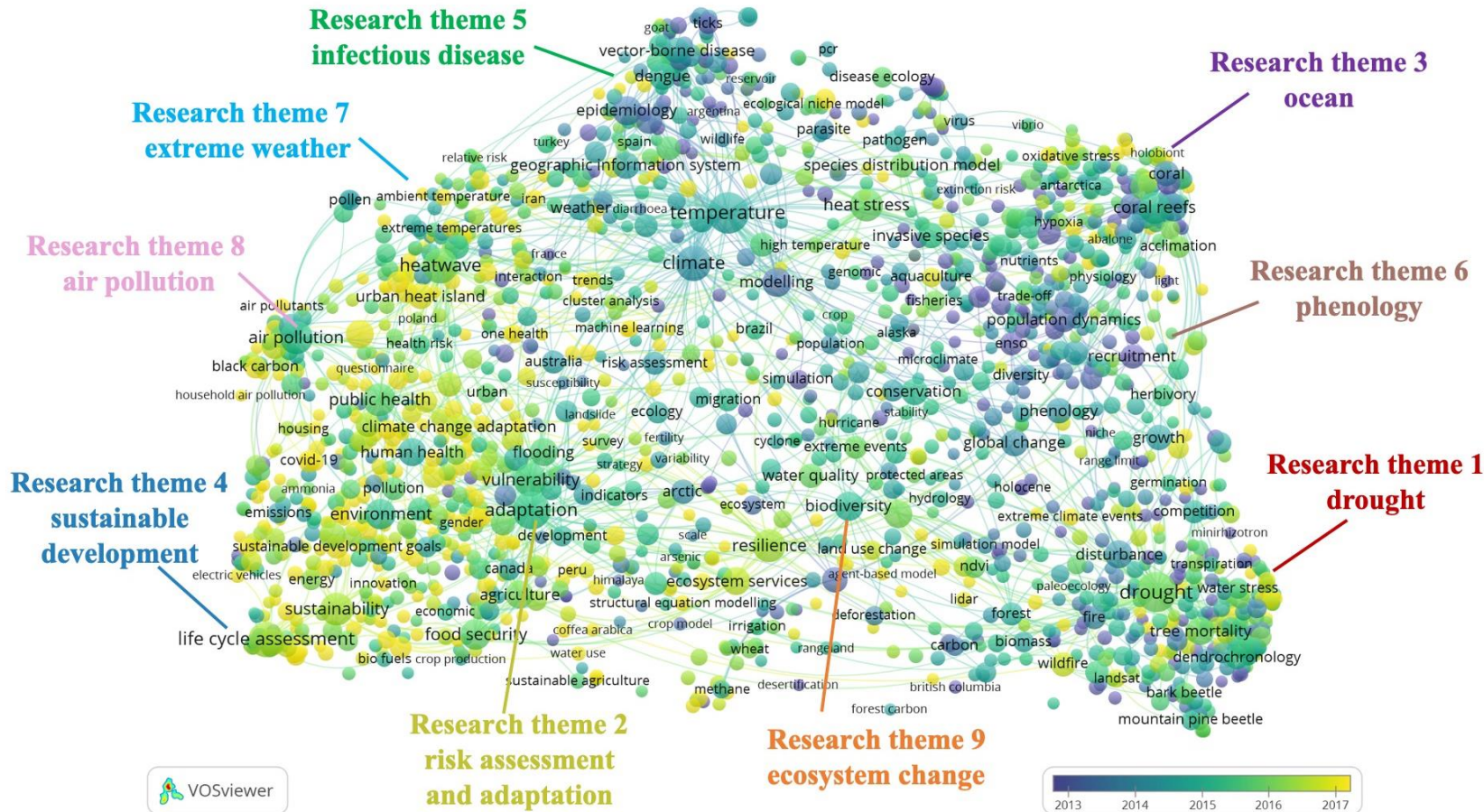
The **first** machine learning forecasting system with comparable performance to **ECMWF ensemble mean** for **15-day** global weather forecast



# Trends and future priorities in the field of climate change and health

## IRDR Pilot Study

27,776 papers from 1991-2020

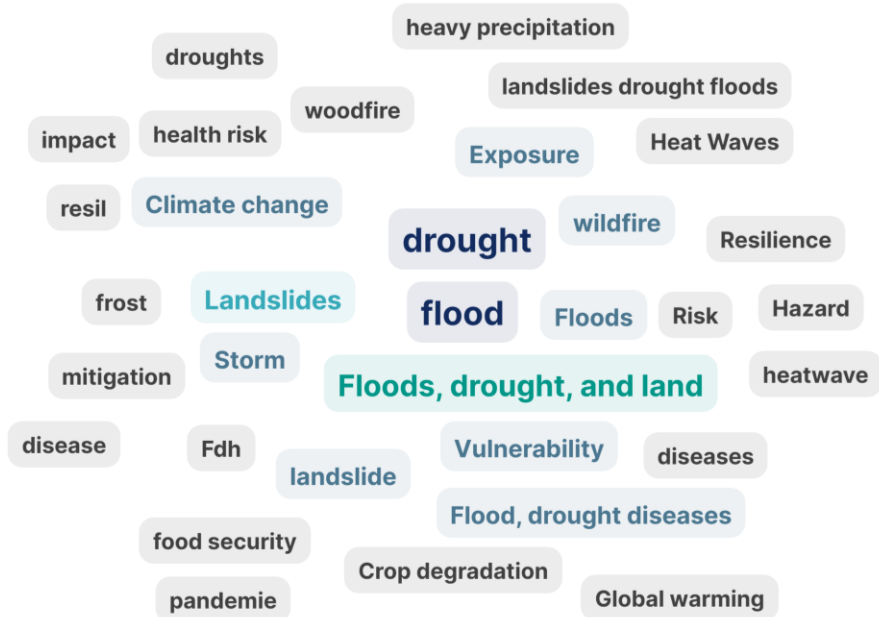


Overlay visualization map derived from VOSviewer Software based on the co-occurrence analysis of 1673 keywords (frequency  $\geq 10$ ) in the field of climate change and health. Color indicates the average appearance time of each keyword. The size of the nodes represents the frequency of the keyword and the line connected two nodes represent the frequency of the co-occurrence of two keywords in the same paper.

# Trainings and courses

- Institute of Advanced Studies in Climate Extremes and Risk Management, organized by WCRP, IRDR and NUIST

Please identify 3 key words on overall climate-related risk landscapes  
Wordcloud Poll ✓ 243 responses 👤 71 participants



# Multi-stakeholder dialogues

## 1<sup>st</sup> CWCC Conference

### The First International Conference Chemical Weather and Chemical Climate(CWCC)

Science, Risks, Impacts, Health and Governance Associated with Multi-scale  
Environmental Perturbations

October 16-20, 2023, Shanghai, China

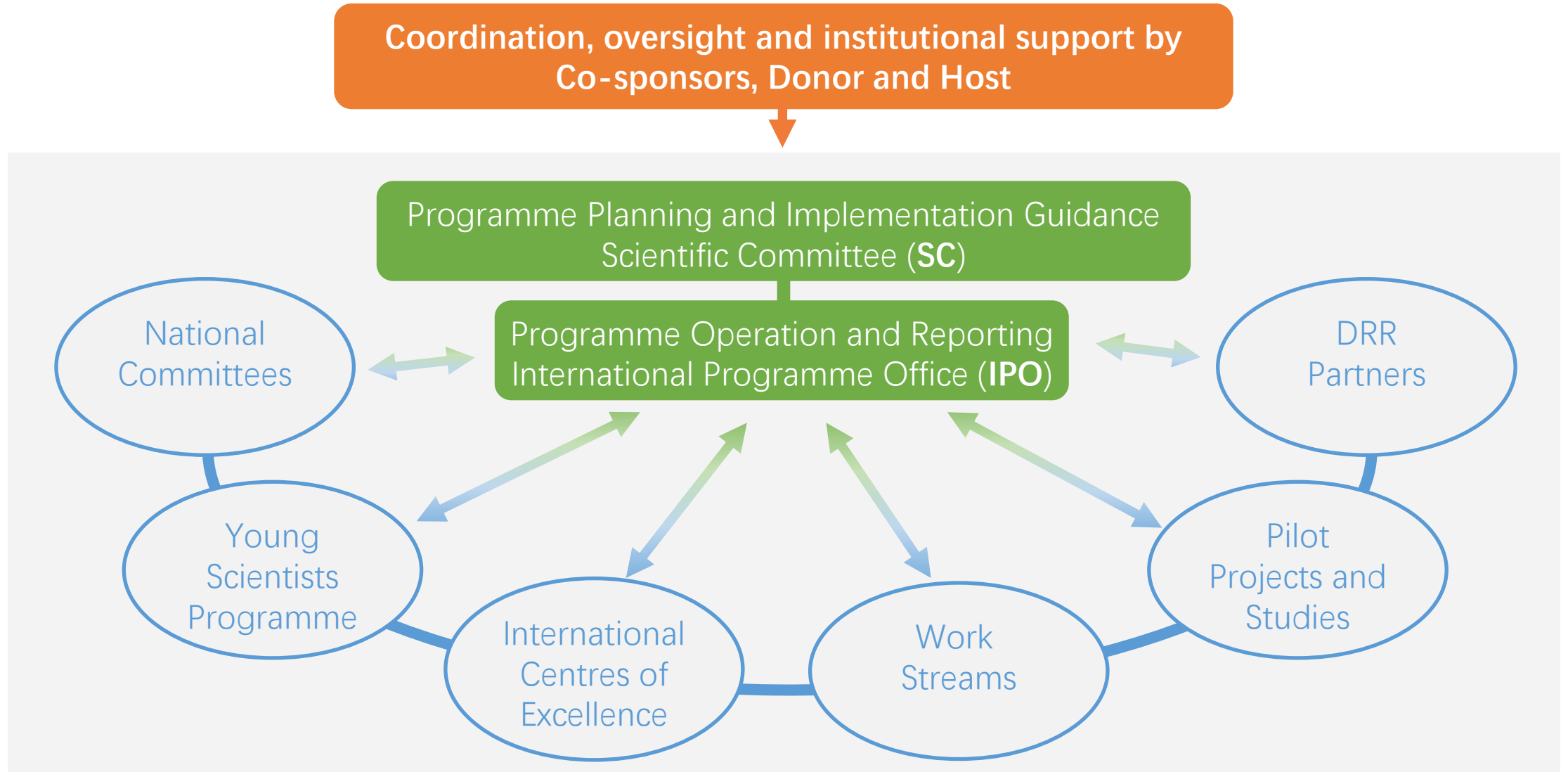
**Session 9: Global partnership on risk inter-connectivity and governance on climate change, weather/climate extremes, atmospheric environment and public health**

#### Suggested Actions

1. Conduct a comprehensive assessment on the **status of global partnership** on risk inter-connectivity and governance on climate change and public health and identify the existing gaps.
2. Promote the interdisciplinary research collaboration and knowledge exchange to understand the systemic risk and its interconnectivity on climate change, weather/climate extremes, atmospheric environment and public health.
3. Foster multi-stakeholder dialogue and collaboration to work in **science-policy-practice interface**. It is critical that the voice of science be heard by policy-makers and the society at large.



# IRDR: a science community for research and actions



# Call for Case Studies on Safeguarding Intangible Cultural Heritage and Climate Actions from Asia-Pacific Region

Deadline: 30 January 2024

For more information, see <https://bit.ly/471mt5Q>



# Thank you!

