



**Asia-Pacific
Economic Cooperation**

2015/EPWG/SDMOF/006

Agenda: 6.3

Adapting to Climate Change and Natural Hazards in the Asia-Pacific Region Using Science and Technology

Submitted by: APEC Climate Center



APEC
PHILIPPINES
2 0 1 5

**9th Senior Disaster Management Officials Forum
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Adapting to Climate Change and Natural Hazards in the Asia-Pacific Region using Science and Technology

Dr. Chin-Seung Chung
Director, APEC Climate Center





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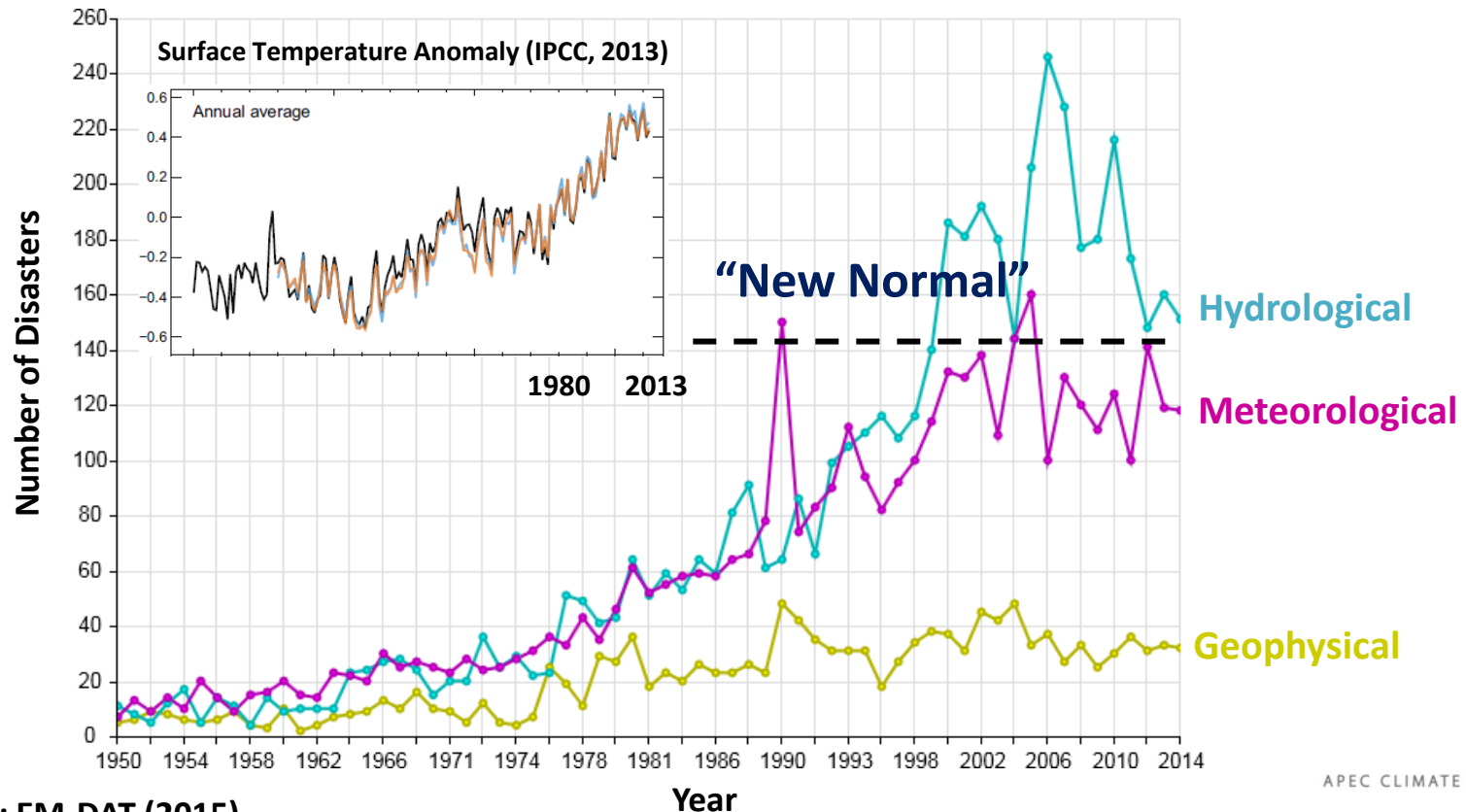
- ✓ APEC Natural Hazards Partnership (ANHP)
- ✓ Action plan for the ANHP
- ✓ APCC’s DRR efforts in the APEC region

The “New Normal” :

The “New Normal” is being created in changing climate

Since 1980, hydro-meteorological disasters have greatly been increased.

- Intensified extreme events in the form of rising temperatures, changing precipitation patterns, and sea storms have contributed to huge economic damages (IPCC 2013)

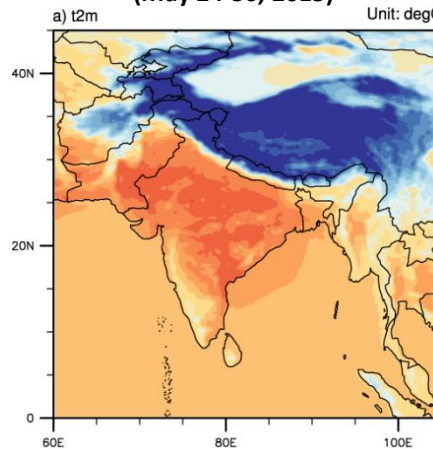


Is the "New Normal" predictable? : Challenges in extreme climate forecasts

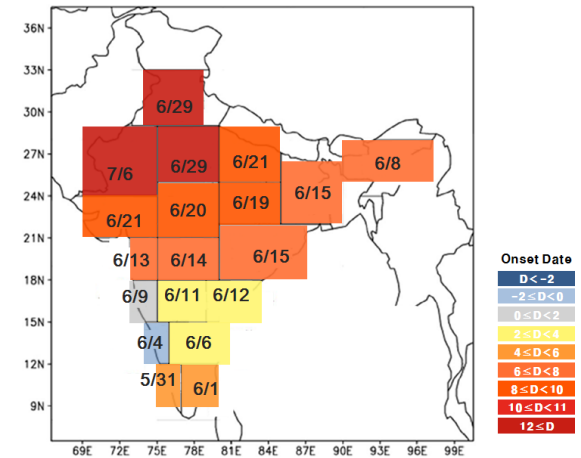
Indian Monsoon onset & extreme heat wave (2015)



Maximum temperature : forecast
(May 24-30, 2015)
Unit: degC



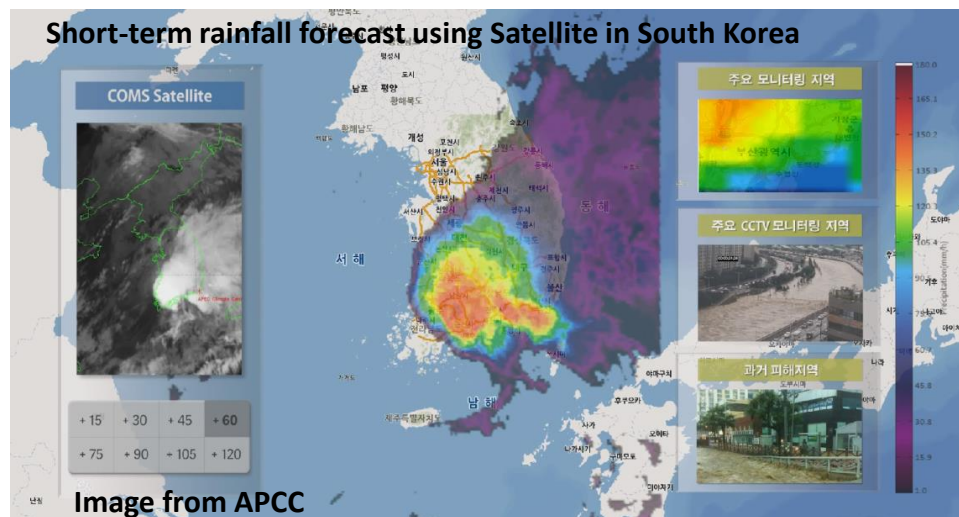
Delayed onset of Indian Monsoon : forecast



Korean heavy rainfall (2014)



Short-term rainfall forecast using Satellite in South Korea



Lack of linking Science and Action : Good forecast, but “bad” outcome



TC Haiyan (Yolanda), Philippines, 3-11 Nov 2013

What worked	What didn't
<ul style="list-style-type: none"> • Good typhoon track and intensity forecasts well in advance • Warnings issued at provincial level • Government was engaged and committed • Good policies and laws guiding for disaster risk management • Good observing network 	<ul style="list-style-type: none"> • Warnings not understood; did not trigger life saving actions • Inundation distance 1-2 km; people needed several hours in poor weather conditions to evacuate – many didn't • Weather models and other hazard models not coupled • Lack of scientific and technical capacity to translate hazard information into impacts

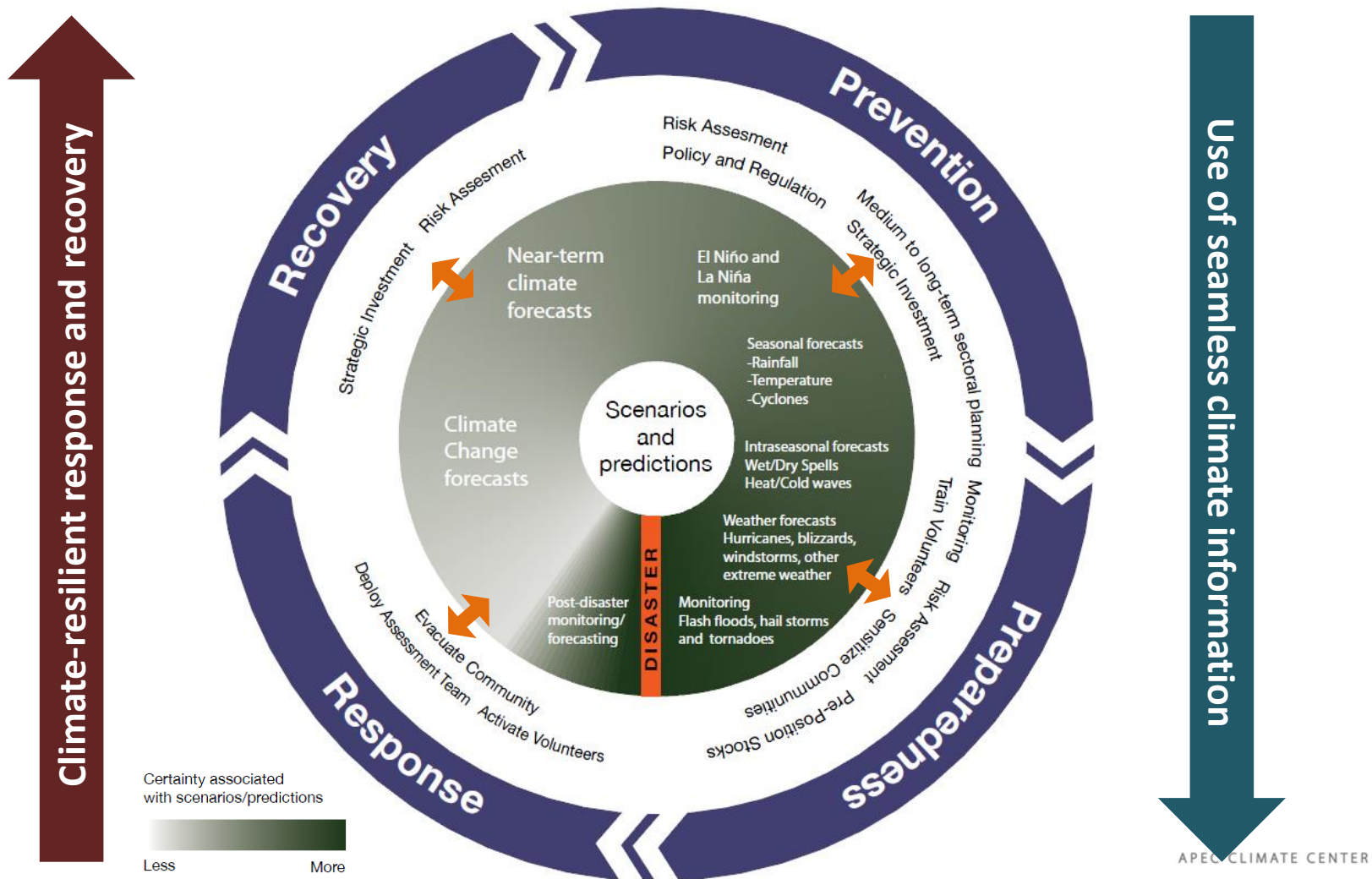
Hazard Warning	Impact Warning (with action)
<ul style="list-style-type: none"> • Yellow alert issued at 21:52 Nov 2nd 	<ul style="list-style-type: none"> • Orange or Red alert issued at 21:52 Nov 2nd – due to severe disruption of traffic and risk to safety of <u>drivers and passengers due to flooding</u> during <u>tomorrow's rush hour</u> • Take emergency action now to prevent high impact by closing roads liable to flooding and <u>rerouting traffic, issuing alerts to public to stay home</u>

Toward better use of climate information for DRR

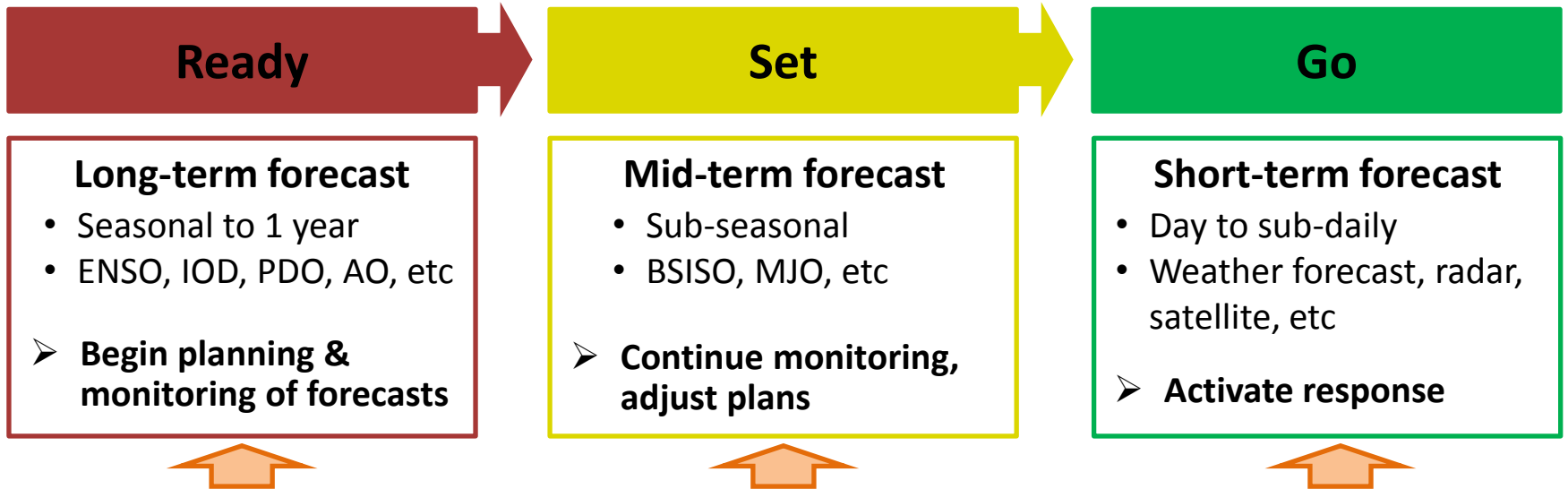
- **Incorporating seamless climate information into existing DRR framework**
 - The maximum incorporation of seamless climate information is necessary for informing decision makers and improving prevention, preparedness, response and recovery
- **Developing impact forecast through interdisciplinary research**
 - Impact forecasting through interdisciplinary research is important because disaster managers and practitioners more readily understand their risks on lives, livelihood, property and economy (Dr. Haleh Kootval, WMO)
- **Enhancing partnership between scientists and decision makers**
 - Disaster management is not simply a technical task. To link climate information more effectively to disaster management, two communities must gain a greater mutual understanding through communication among scientists, decision makers, and society
- **Capacity building and training for developing countries**
 - Capacity building is also necessary to enhance abilities and skills in disaster management through providing scientific expertise and know-how from donors to the government officials in developing countries

Adapting to the "New Normal" :

Innovation for incorporating climate information into disaster management framework



Adapting to the “New Normal” : Seamless climate information and DRR implementation



APEC Climate Center’s seamless climate forecast service

**Up to 6-month
Seasonal prediction**

APCC MME Forecast for JFM 2008

APEC Climate Center predicts continuation of cool condition in the northern part of North America into early spring.

Latest synthesis of climate model forecasts of the APEC Climate Center (APCC) indicates below normal temperatures over the Canadian region, owing to prevailing La Niña over the tropical Pacific. In the January-to-March (JFM) season in 2008, meanwhile, warmer conditions is expected over coastal East Asia.

Our Multi-Model Ensemble forecast for 2008 JFM shows that the current La Niña will continue into the Northern Hemisphere early spring. Cold conditions in the northern part of North America, as seen during December, will prevail in the JFM season. In contrast, it will be warmer than normal, with reduced rainfall, over more southern part of the US, the Gulf Coast region and northern part of Mexico. Equatorial central America and northern regions of South America will experience wet conditions and cooler seasonal temperature.

Enhanced precipitation is expected over the Philippines, eastern to northeastern part of continental Australia, as well as southeastern portions of the Polynesian islands. Coastal East Asia in the mid latitudes, including the northern Japanese archipelago region, will see some warming in the JFM season.

The dry conditions over part of the Middle East will continue. In particular, suppressed rainfall is expected over a broad region from northern India to southeast to South Arabia. Equatorial Africa may also see some cold and dry conditions. It will be warmer than normal over equatorial to southern Indian Ocean.

**Subseasonal forecast
BSISO**

BSISO Forecast for 30Oct2014 - 18Nov2014

BSISO 1 (30 Oct - 13 Nov) and BSISO 2 (14 Nov - 18 Nov) phases are shown with various meteorological parameters.

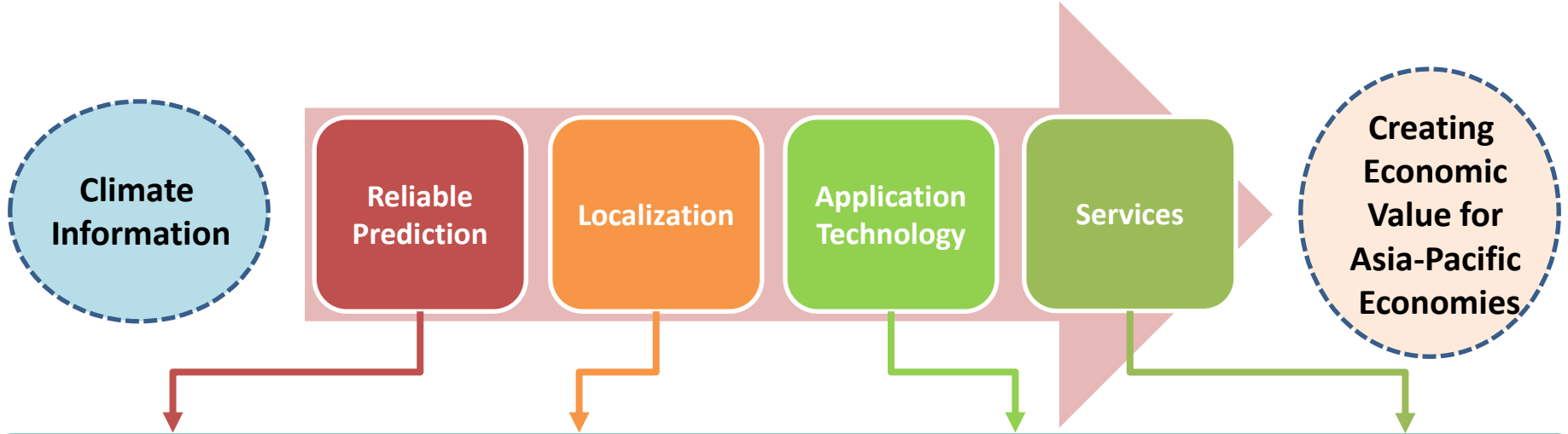
**Short-term forecast
Satellite images**

Rainrate 1350 LST 25 AUG

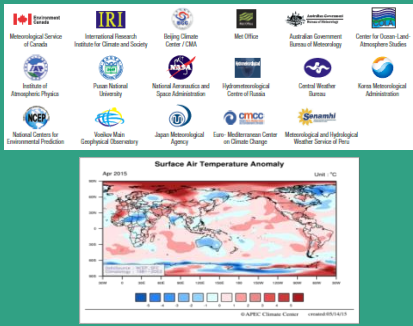
Map showing rain rate over Pusan area with distance markers.

What else do we need? :

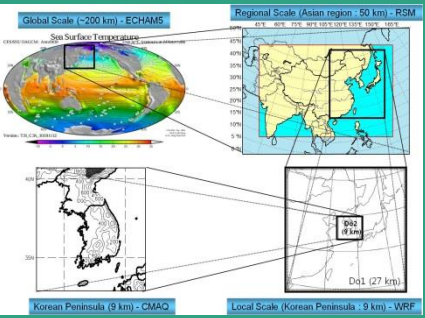
Technology for tailored climate information and interdisciplinary approach



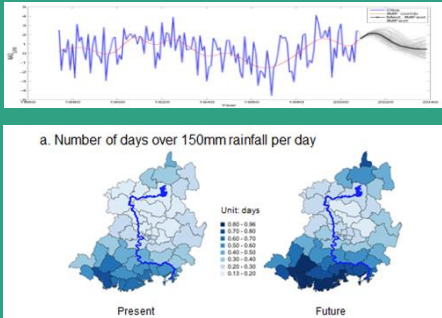
Multi-model ensemble



Downscaling



Impact assessment

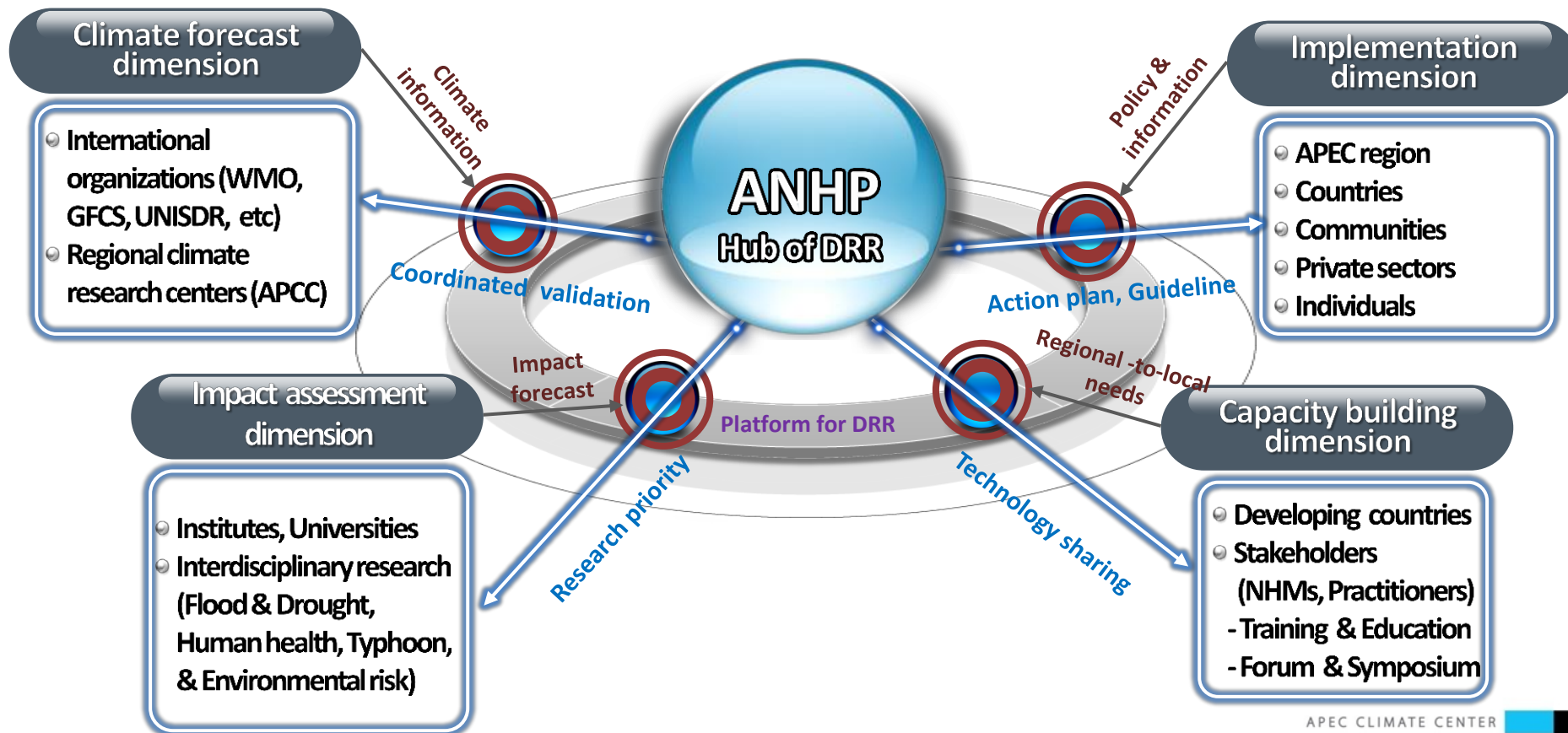


User-friendly services



Toward sustainable collaboration & Capability for DRR : APEC Natural Hazards Partnership (ANHP)

- In order to deliver coordinated usable assessments, research and advice on DRR decision for governments and resilience communities across APEC economies



Toward sustainable collaboration & Capability for DRR :

Action plan for the ANHP

Identify national and local priorities



Assess risks and develop tools



Reduce the underlying risk factors



Strengthen planning capacities

Climate Forecast

- Identify mutual roles among climate information providers in the APEC region
- Enhance active collaboration of operational centers for data sharing and information services
- Advance seamless early warning system for DRR

Implementation

- Develop the framework for systematic dialogue between decision makers and scientific communities
- Improve accessibility of decision makers to existing information through developing APEC DRR platform
- Strengthen the risk-aware investment at all levels (national, local, private sector, etc)

Impact Assessment







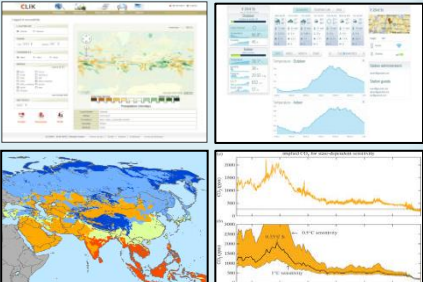

- Develop integrated, multi-disciplinary research programs on DRR based priorities
- Develop demand-driven impact assessment tools and evaluation
- Identify cost effective DRR options by risk assessment

Capacity Building

- Development of awareness and communication strategies for targeting communities and private sectors
- Strengthen human resource capacity of APEC economies for DRR at national and local levels
- Develop and implement DRR education and training programs

Toward sustainable DRR collaboration : APCC's DRR efforts in the APEC region

APCC aims to contribute to economic growth in the APEC region and support the protection of lives and property, the reduction of economic losses, and enhance economic opportunities.

 Climate Prediction	 Interdisciplinary Research	 Climate Info. Services	 International Cooperation
<p>APCC produces value-added, reliable, and real-time climate prediction information and provides the APEC region with it.</p>	<p>APCC leads in the development of interdisciplinary research and application techniques at the climate-environment-society nexus.</p>	<p>APCC strives to be a key climate database center to distribute climate data, information products, and related tools.</p>	<p>APCC guides developing countries from the APEC region toward building their own capacity to produce reliable climate prediction information.</p>
<ul style="list-style-type: none"> • 3 & 6 month forecast • ENSO, IOD forecast • S2S BSISO forecast • Downscaled climate change scenarios 	<ul style="list-style-type: none"> • APCC-CRIEPI Project • APCC-NCDR Project • APCC-CARDI Project • APCC-IRI Project • APN Project • ROK-PIF Project • Tonga Project • ASEAN Project 	<ul style="list-style-type: none"> • Climate information tool kit (CLIK) • ADSS • TRACE • Open API 	<ul style="list-style-type: none"> • APEC Climate Symposium • APCC Training programs • Young Scientists Support Program 

THANK YOU!

