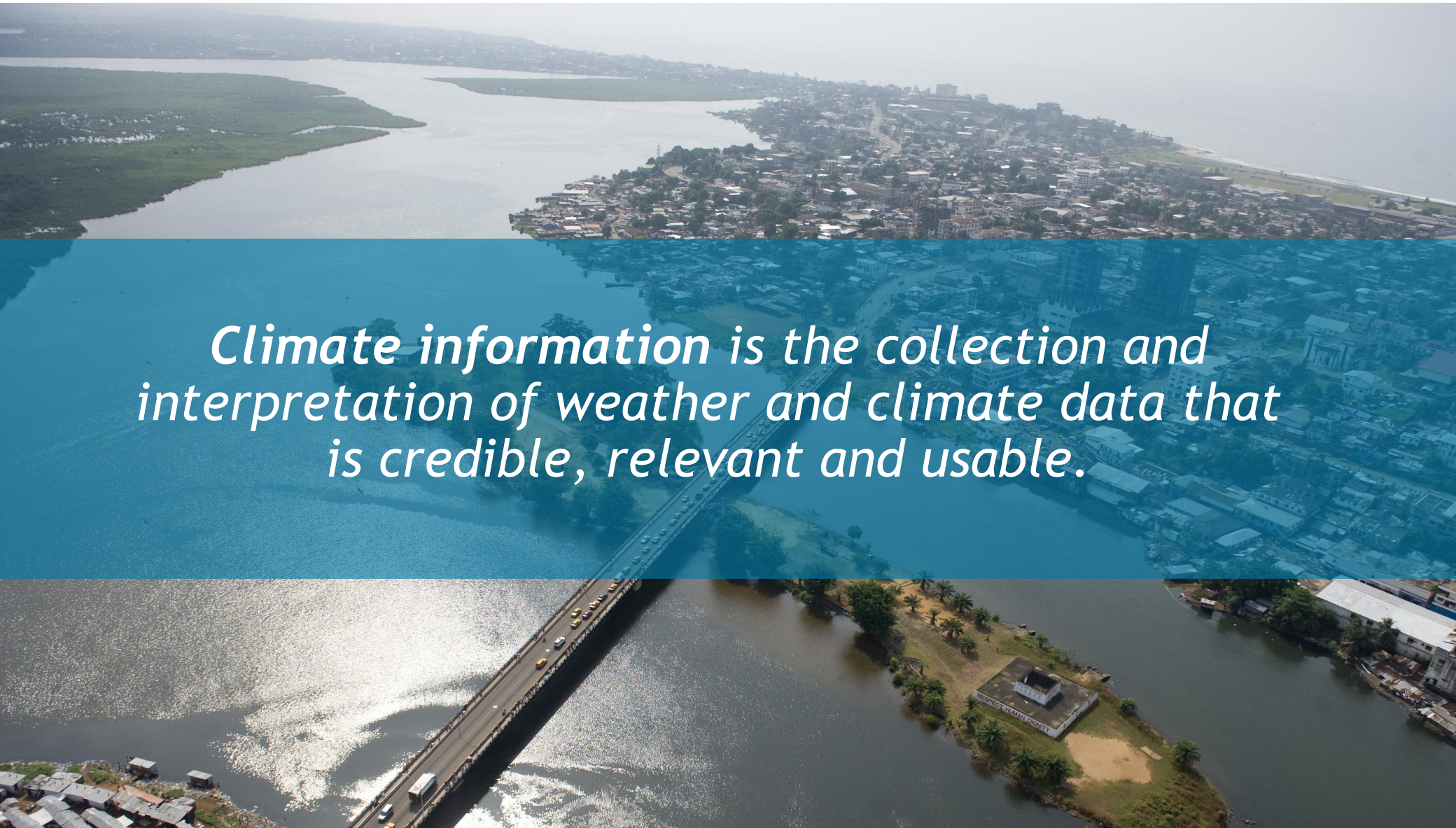
NAP-GSP REGIONAL TRAINING WORKSHOP FOR ASIA
Mainstreaming Climate Change Adaptation into Water Resources

Seoul, 13 - 16 September 2017

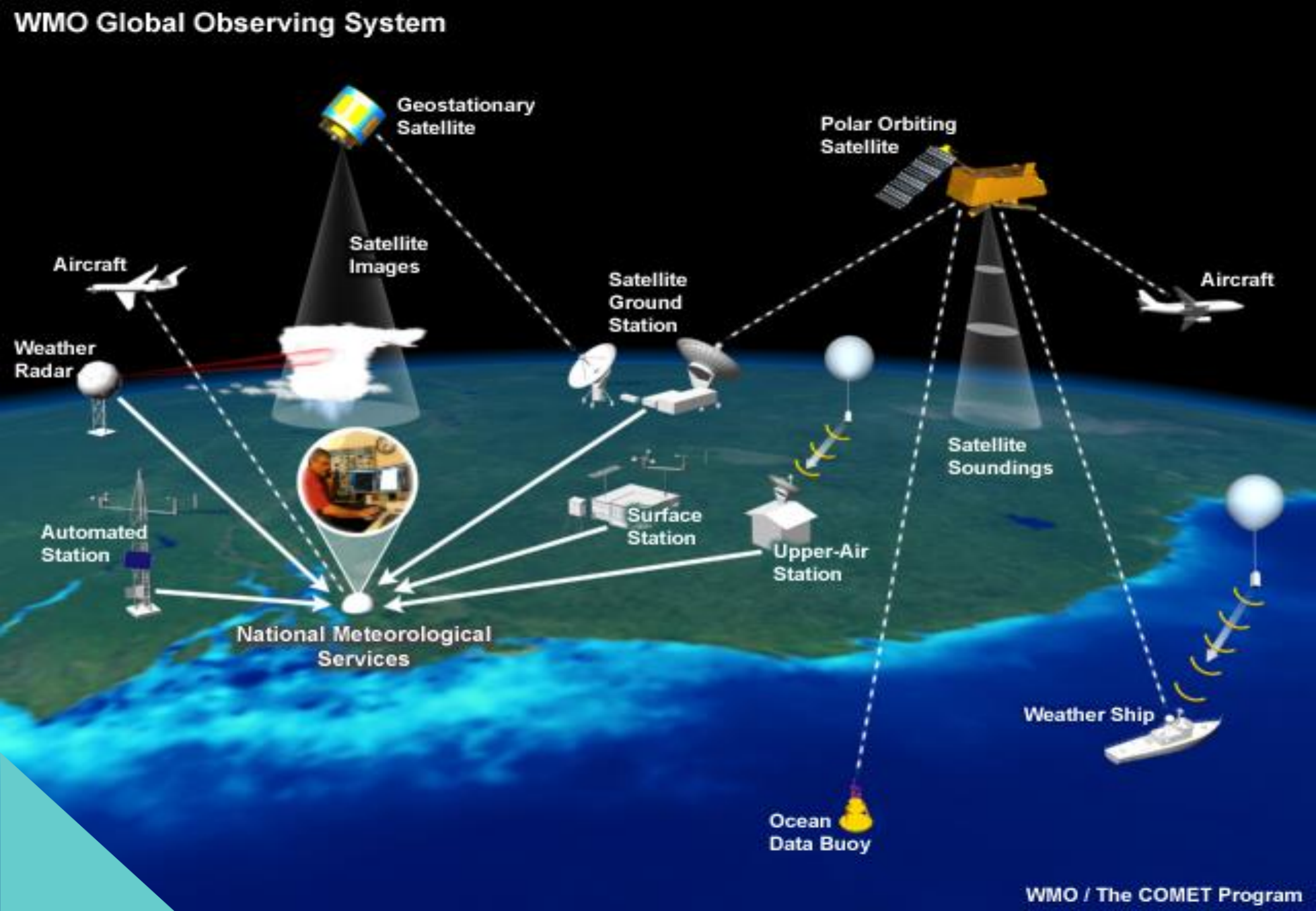
Ssession 2: Climate Information and Services

Amir H. Delju (WMO)

Climate information



Climate information *is the collection and interpretation of weather and climate data that is credible, relevant and usable.*

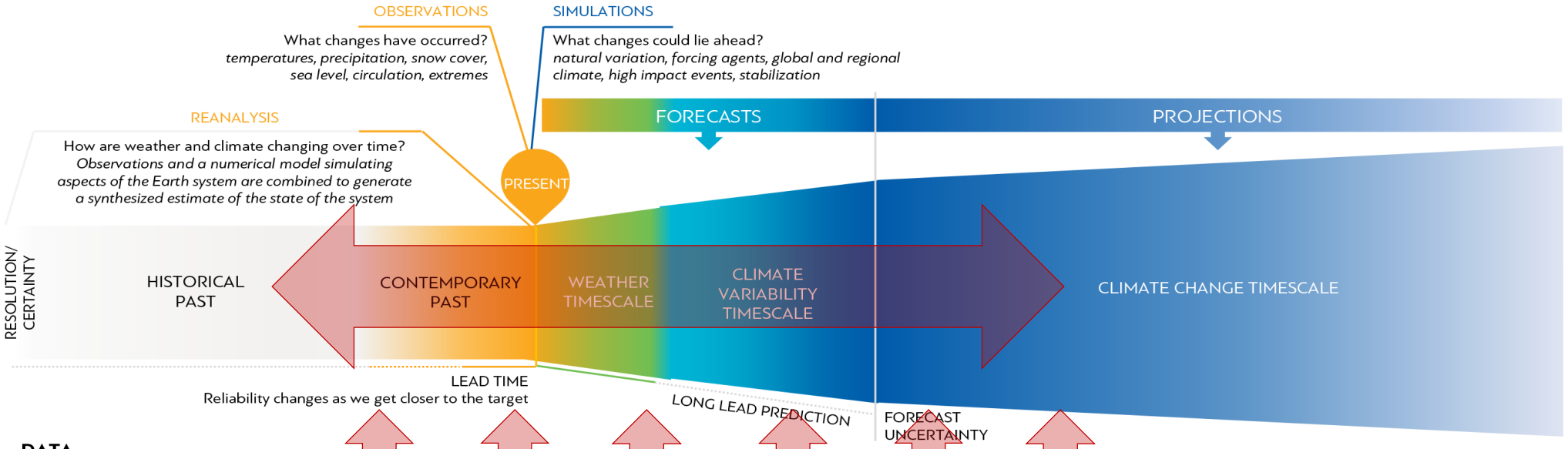

WMO Global Observing System
Geostationary Satellite
Polar Orbiting Satellite
Satellite Images
Aircraft
Satellite Ground Station
Aircraft
Weather Radar
Satellite Soundings
Surface Station
Automated Station
Upper-Air Station
National Meteorological Services
Weather Ship
Ocean Data Buoy
WMO / The COMET Program

Climate Data, Products and Information

- Raw data, summaries, tables, graphs, maps, reports and analyses. Spatial distributions
- Historical climate data sets for characterizing past climate behavior on all time and space scales (time series)
- Standard, occasional and specialized products (locally produced for user groups)
- Climate monitoring products-analyzing the state of both past and current climate and global to regional teleconnections
- Indices- historical climate patterns to the user in a simple and readily understandable form
- Climate outlooks- forecasts of the values of climate elements averaged over timescales of about one month to one year
- Climate prediction- a probabilistic statement about the future climate on timescales ranging from years to decades
- Climate projection- a statement about the likelihood that something will happen several decades to centuries in the future
- a plausible future climate constructed for investigating the potential consequences of human-induced climate change
- Global Climate models- climate processes on a global scale
- Downscaled products- Regional and local climate models

CLIMATE SERVICES INFORMATION SYSTEM

Data and Products for Climate Services



DATA

Historical data consists of
Instrumental data - century-long measurements of surface temperature and precipitation, records of daily data
Paleoclimate data - derived from natural sources such as tree rings, ice cores, corals, and ocean and lake sediments

Monitoring

Uses data from recent past and the present

Sub-seasonal to Seasonal

Flash flood guidance
Severe weather forecasting
Tropical cyclone forecasting

Interannual

Climate Change Indices

PRODUCTS

Past climate

Climate trends, Extreme climate indices, Sector-specific climate indices, Reanalyses, Return periods of extremes, Climate Normals , World Weather Records

Weather

Initial conditions

Climate variability

Boundary conditions (sea surface, snow cover, land), Climate monitoring and watch

Multi-decadal

Projections

Operational projections on climate change timescales

TOOLKIT - facilitates operations and used typically by forecasters

TAILORED PRODUCTS FOR DECISION SUPPORT – products can either be tailored in space and time or according to the decision relevance

DECISION SUPPORT APPLICATIONS – climate services apply past climatological records, contemporary monitoring and expected future conditions to socio-economic sectors

In agriculture, to inform crop choice, planting to optimize yield and minimizing crop failure risk
Disaster risk identification based on extreme event return periods and trends

Emergency response, Disaster Risk Reduction

Contingency plans, humanitarian response, government and private infrastructure investment

Informs mitigation policy and adaptation choices
Impacts on water resources, heat stress, crops, infrastructure

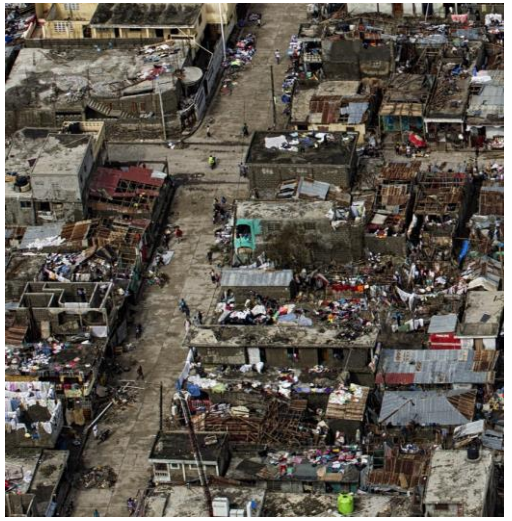
SERVICE DELIVERY AT COUNTRY LEVEL

Climate Information and Services are crucial resources for decision-makers at all levels working on medium and long-term planning.

ADAPTATION PLANNING

SECTORAL DEVELOPMENT

MANAGE DISASTER RISK



PLAN FOR FUTURE RISK

Types of climate information

Depending on the level of complexity, climate information can be characterized as:

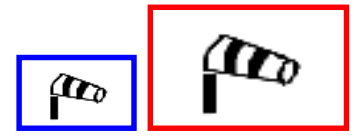
BASIC

INTERMEDIATE

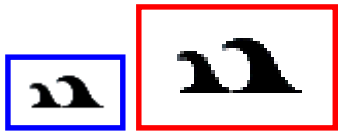
ADVANCED

NB! This classification is based on the complexity of the information, ***not*** the level of complexity of the decision it could inform.

Concern...

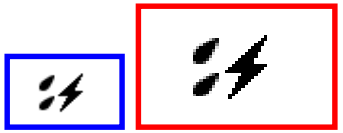


Strong Wind

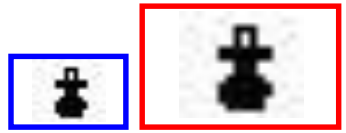


Coastal Marine Hazards

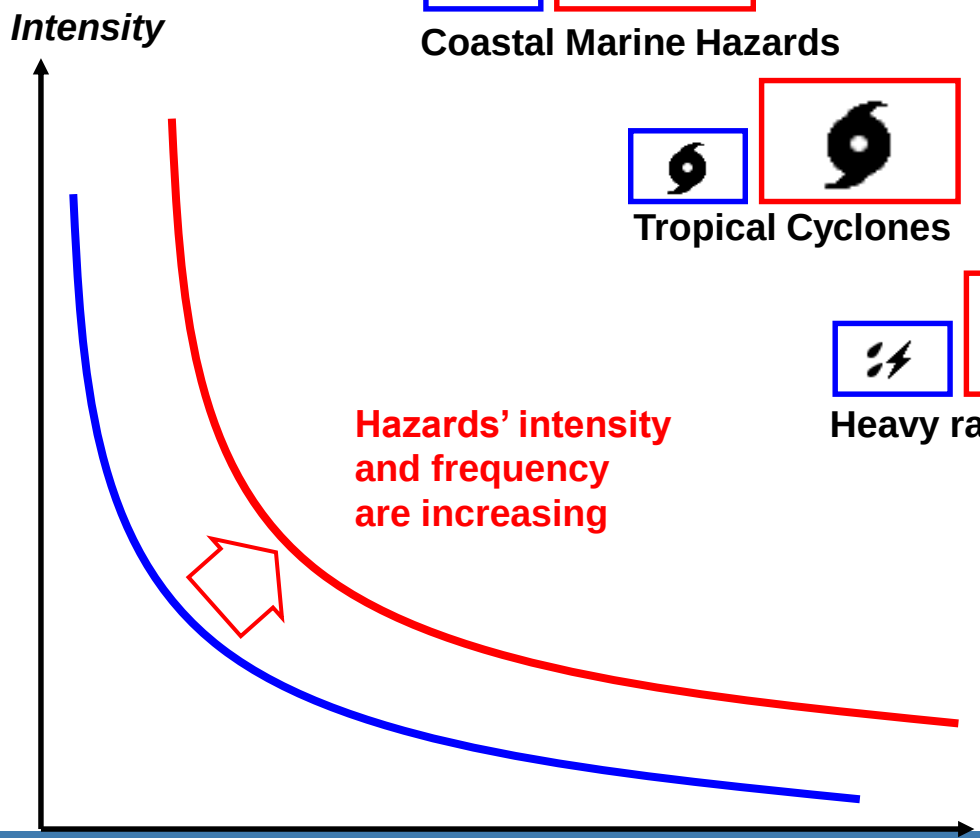
Tropical Cyclones



Heavy rainfall / Flood



Heatwaves

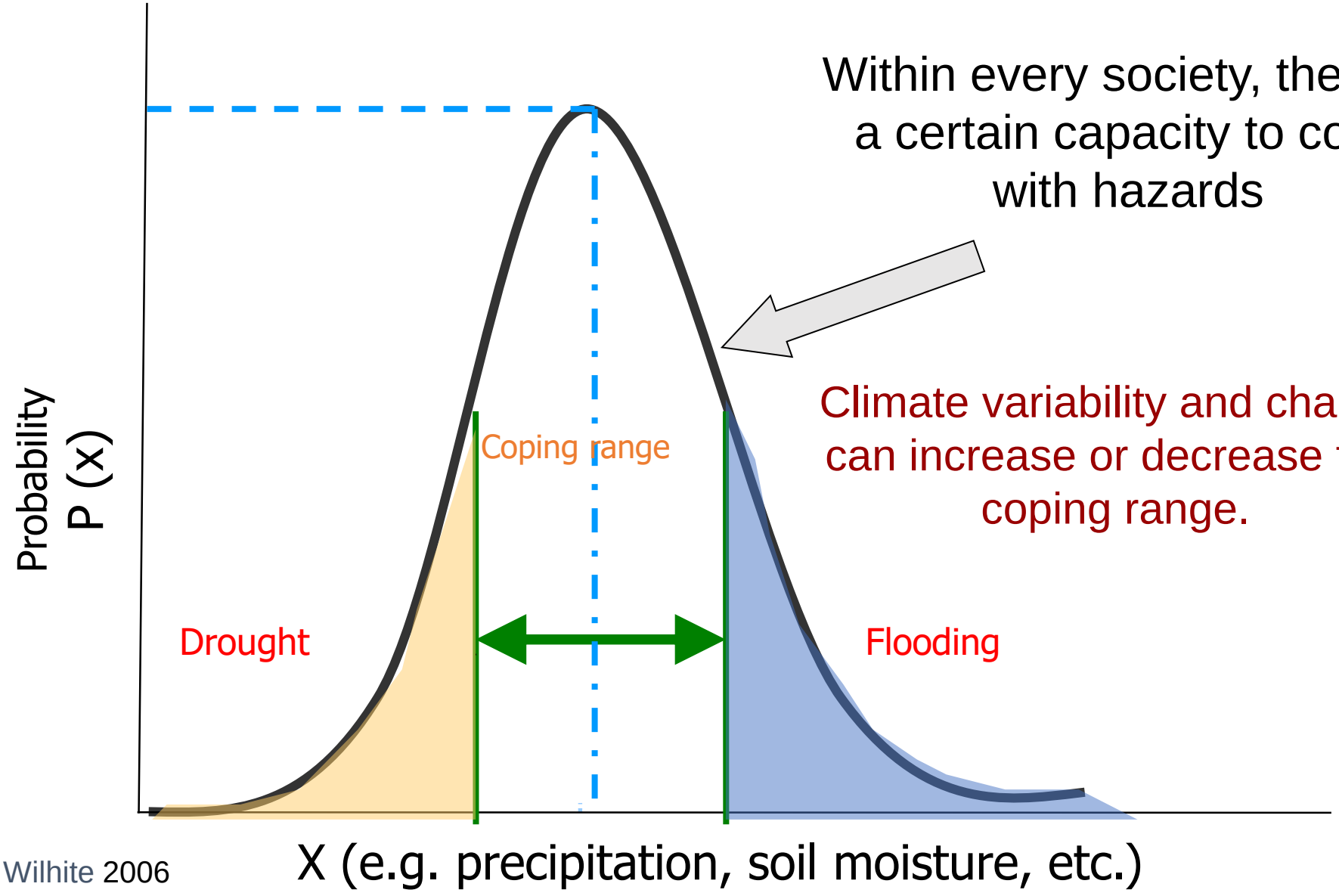


Hazards' intensity and frequency are increasing

Vulnerability and exposure on the rise !

Information products and services based on climate predictions, key tool to support adaptation

What it used to be...



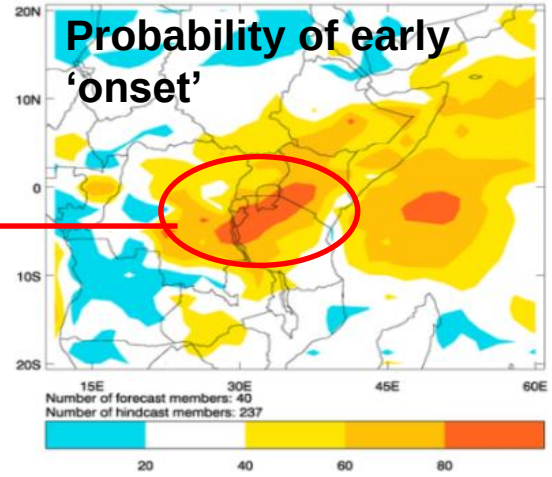
Within every society, there is a certain capacity to cope with hazards

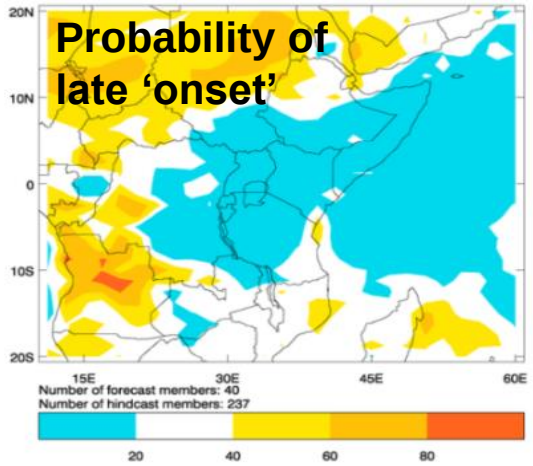
Climate variability and change can increase or decrease this coping range.

Source: Wilhite 2006

New trial user products: onset prediction and monitoring

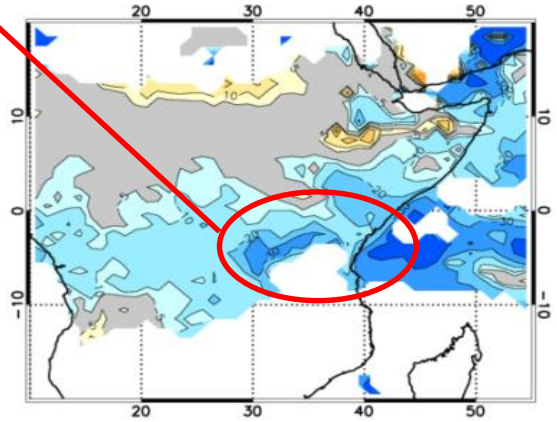
Early onset predicted most likely





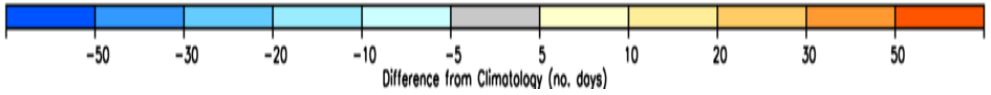
Prediction is based on local time of arrival of 20% of long-term seasonal average

Early onset occurred



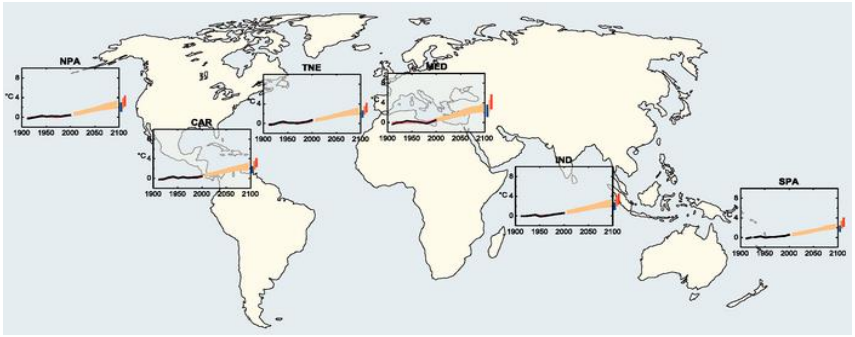
Greater Horn of Africa, short-rains season 2011 – 1 month lead time prediction

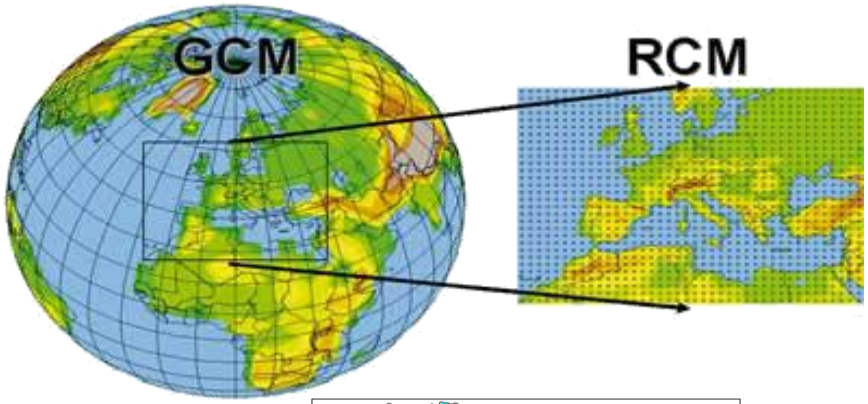
CSRP monitoring product: Observed time of 'onset' (in days difference from long-term average

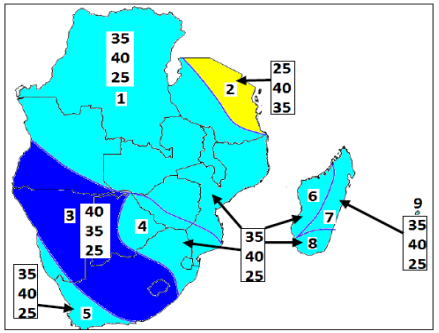


- **Assessment over retrospective cases indicates forecast can discriminate early/late onset in ~70% of cases**
- **Onset forecasts being trialled at regional centres in East, West and southern Africa**

Examples of climate services



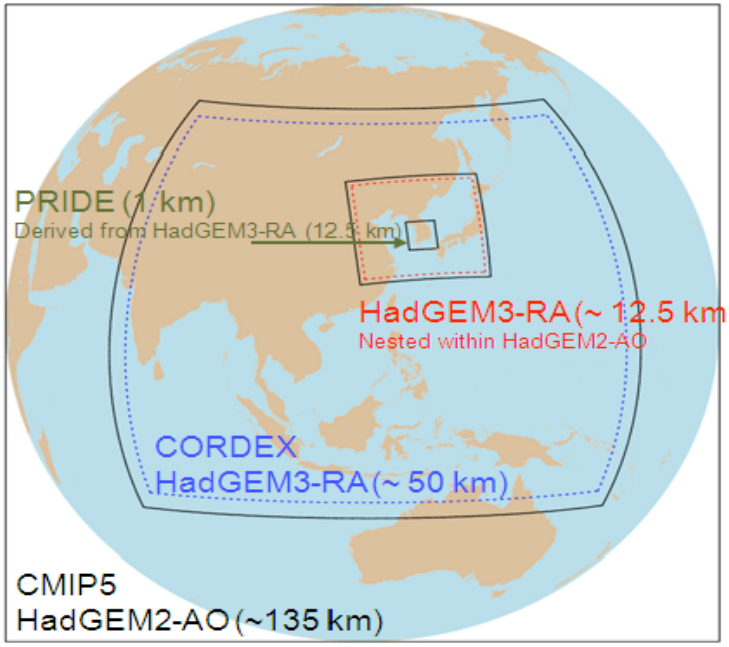




- **Expected future temperature**
- **Precipitation scenarios**
- **Sea level changes**
- **Snow, glacier and sea ice coverage**
- **Seasonal tropical cyclone activity**
- **Growing seasons**
- **Potential impacts of climate change on the natural environment and major business and public sectors**

A Regional Downscaling Project coordinated by KMA

Domains for climate projections at KMA



KMA/NIMR

CMIP5 experiment with HadGEM2-AO and provide GCM forcing
Regional downscaling for 2 domains with HadGEM3-RA
Maintaining CORDEX-EA databank

Dynamical Downscaling Group	Statistical Downscaling Group	(Extreme) Analysis Group	Application Group
• Multi-RCMs forced by HadGEM2-AO • Ensemble method • Uncertainty Assessment	• Methods' Development • High-resolution projection data up to 1 km • Focusing on national scenario	• Evaluation of CORDEX outputs for extreme events • Evaluation of Tropical Cyclones	• Essential factors for administrative districts in *agriculture*, *health*, and *disaster prevention* sectors.

- 5 regional climate models for CORDEX-EA domain (50 km) and smaller sub-region (12.5 km).
- 1 statistical downscaling model for Korean peninsula up to 1 km's resolution.
- 1 group from Japan (U.Tokyo) has participated recently.

Applications

- Based on the results from 4 RCPs × 2 RCMs
- Spatial distribution and time series for 230 administrative districts
- Essential factors for agriculture, health, and disaster prevention sectors.

<Agriculture>

growth duration, effective accumulated temperature, winkler scale, vegetable period, crop period, frostless period, chill units, climatic productivity index, thermo-hydro index, evapotranspiration, heating period, cooling period, etc…

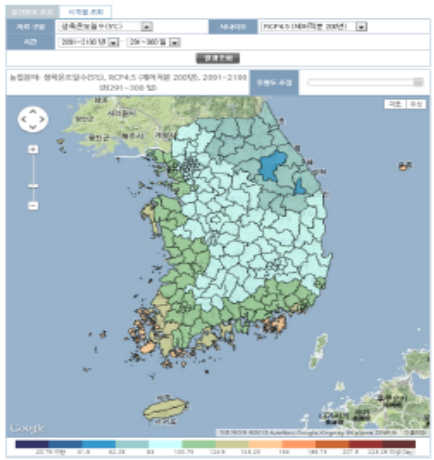
<Health>

Heat Index (HI), Discomfort Index (DI), Apparent Temperature (AT), Net Effective Temperature (NET), Humidex, Windchill

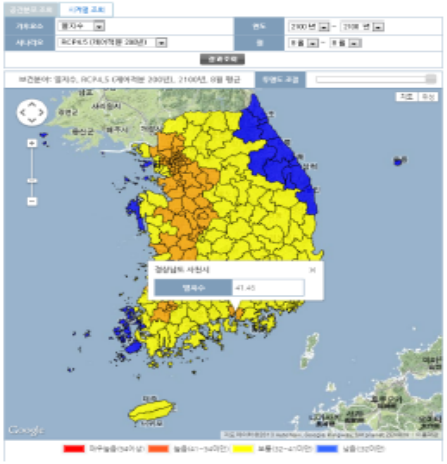
<Disaster Prevention>

Standard Precipitation Index (SPI)

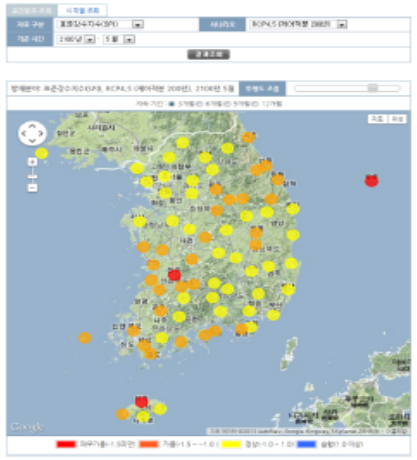
생육온도일수 공간분포 조회 화면



일지수 공간분포 조회 화면



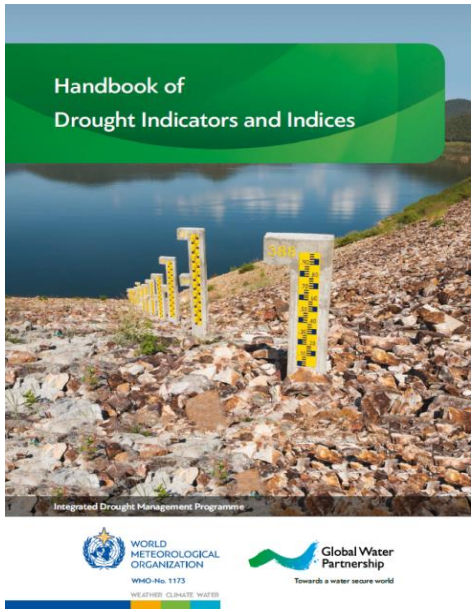
SPI 공간분포 조회 화면(RCP4.5, 2100년)

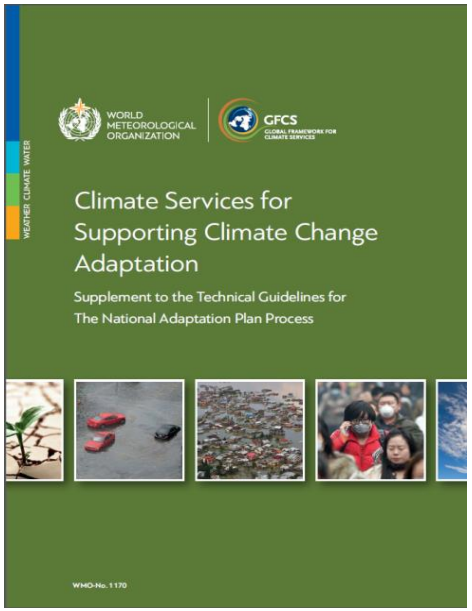


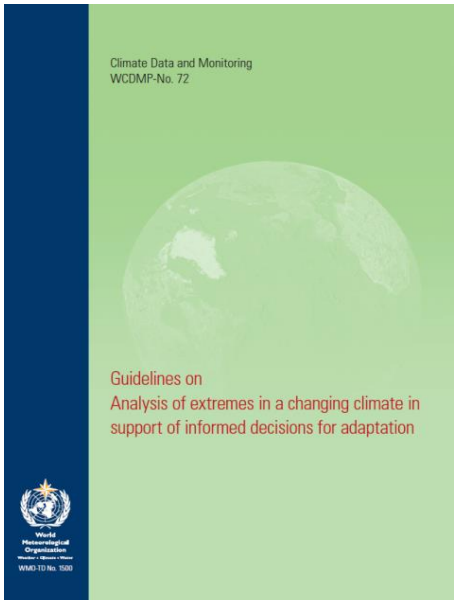
End-users

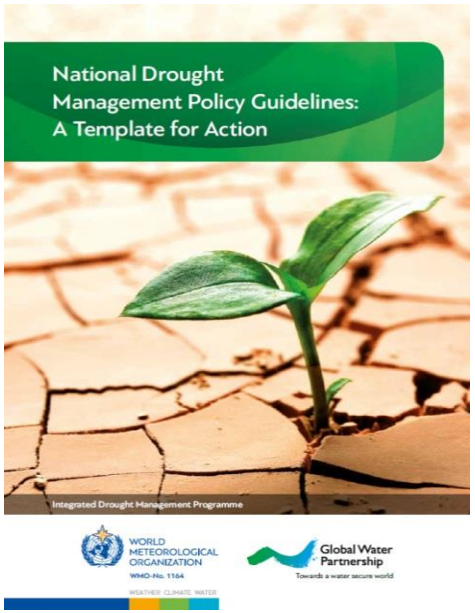
Communities Private sector Policy-makers

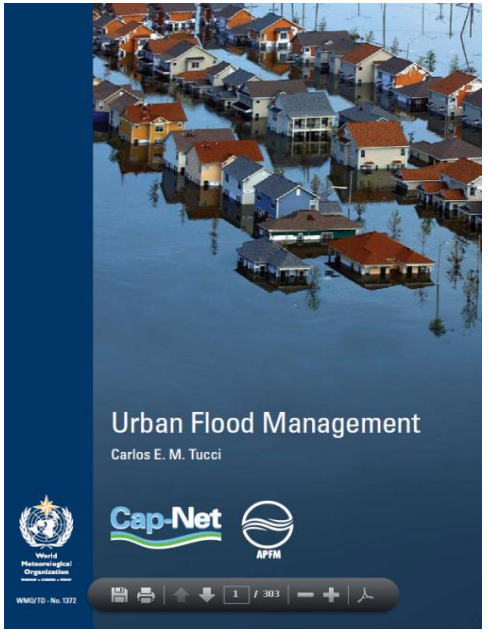
Anybody who needs to make a decision on a matter that is affected by the weather and climate can benefit from climate information and services.

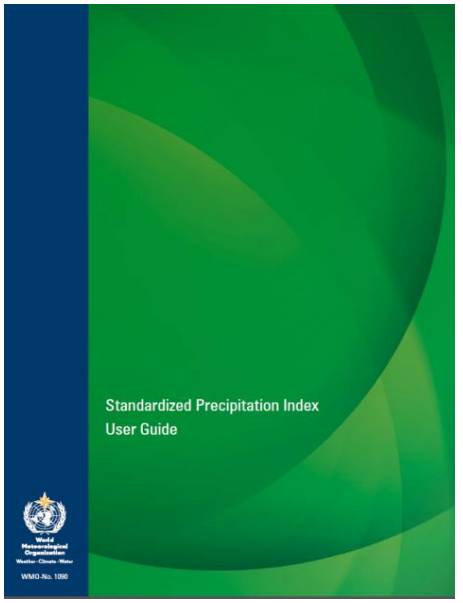

Handbook of
Drought Indicators and Indices
Integrated Drought Management Programme
WORLD METEOROLOGICAL ORGANIZATION
WMO-No. 1173
Global Water Partnership
Towards a water secure world

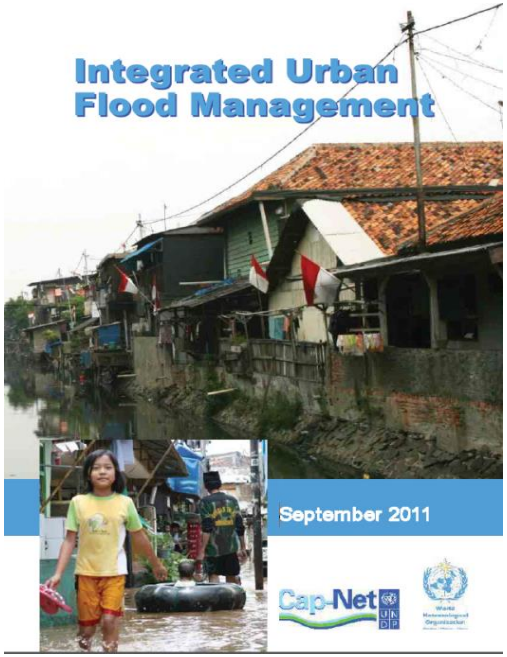

WORLD METEOROLOGICAL ORGANIZATION
GFCS
GLOBAL FRAMEWORK FOR CLIMATE SERVICES
WEATHER CLIMATE WATER
Climate Services for
Supporting Climate Change
Adaptation
Supplement to the Technical Guidelines for
The National Adaptation Plan Process
WMO-No. 1170

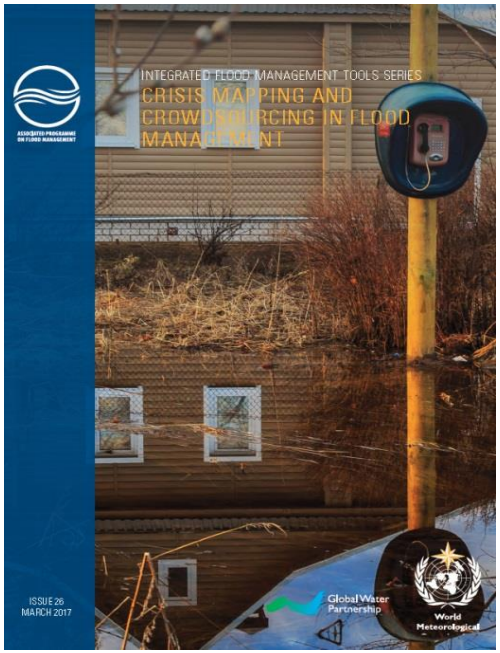

Climate Data and Monitoring
WCDMP-No. 72
Guidelines on
Analysis of extremes in a changing climate in
support of informed decisions for adaptation
World Meteorological Organization
WMO-TD No. 1500

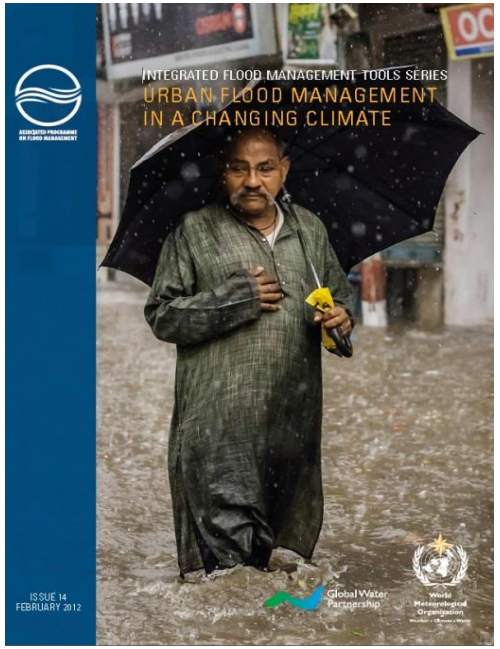

National Drought
Management Policy Guidelines:
A Template for Action
Integrated Drought Management Programme
WORLD METEOROLOGICAL ORGANIZATION
WMO-No. 1164
Global Water Partnership
Towards a water secure world

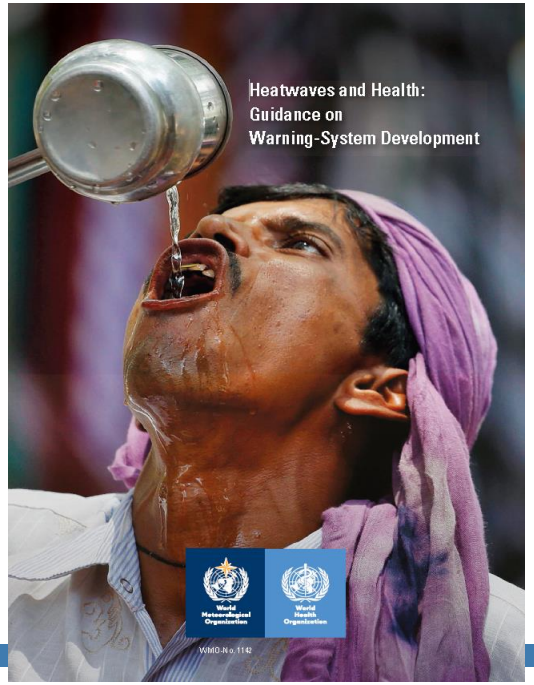

Urban Flood Management
Carlos E. M. Tucci
Cap-Net
APFM
World Meteorological Organization
WMO/TD - No. 1372

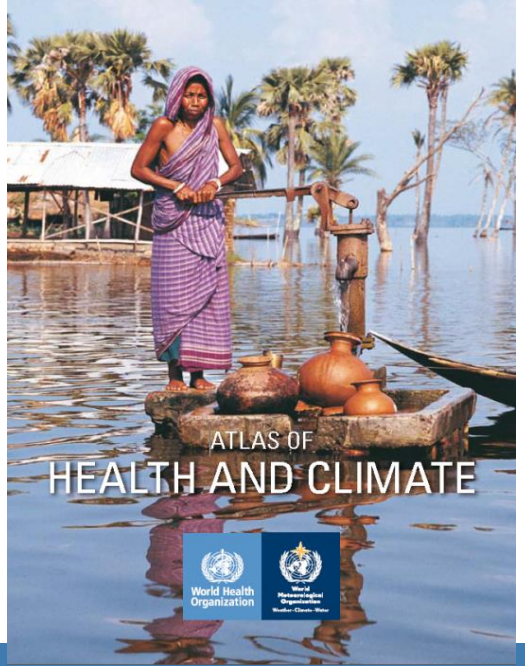

Standardized Precipitation Index
User Guide
World Meteorological Organization
WMO-No. 1090

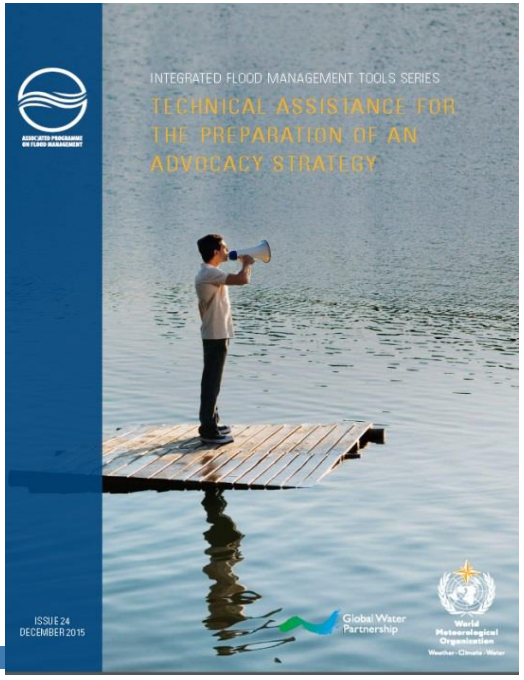

Integrated Urban
Flood Management
September 2011
Cap-Net

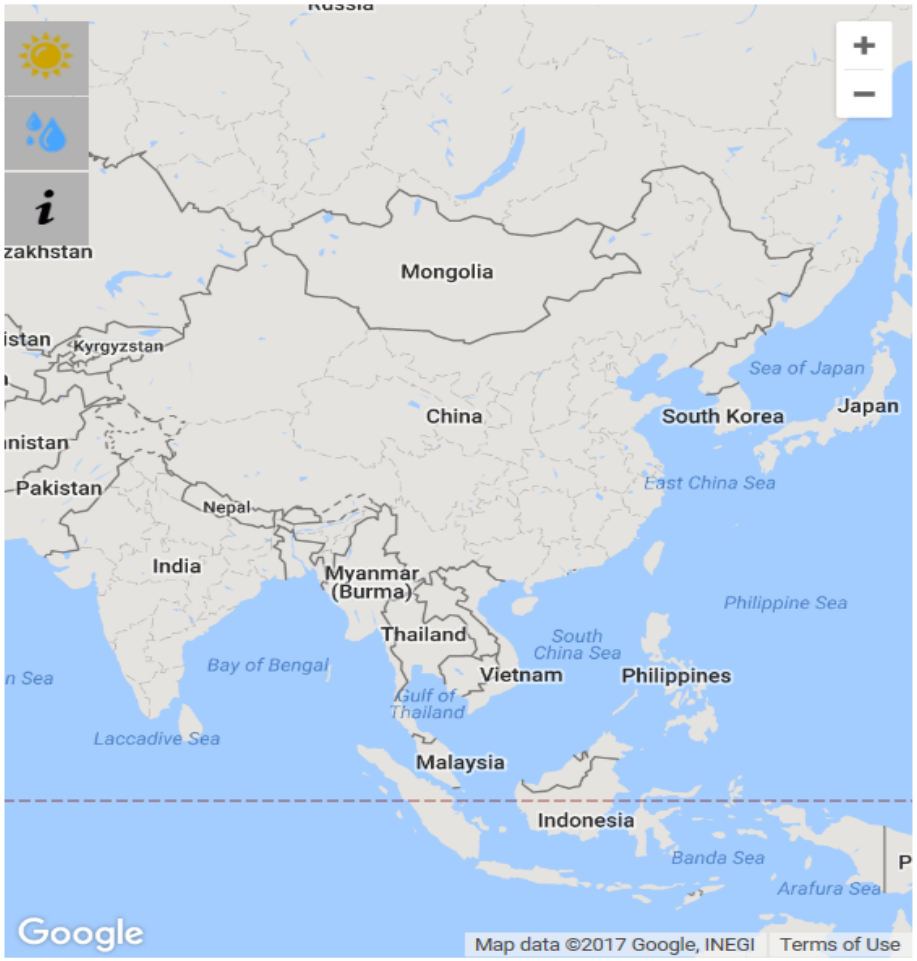

INTEGRATED FLOOD MANAGEMENT TOOLS SERIES
CRISIS MAPPING AND
CROWDSOURCING IN FLOOD
MANAGEMENT
ISSUE 26
MARCH 2017
Global Water Partnership
World Meteorological


INTEGRATED FLOOD MANAGEMENT TOOLS SERIES
URBAN FLOOD MANAGEMENT
IN A CHANGING CLIMATE
ISSUE 14
FEBRUARY 2012
Global Water Partnership


Heatwaves and Health:
Guidance on
Warning-System Development
World Meteorological Organization
World Health Organization
WMO-No. 1142

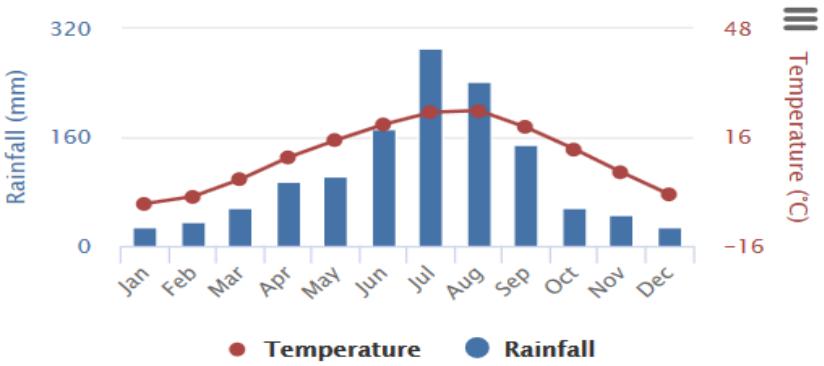

ATLAS OF
HEALTH AND CLIMATE
World Health Organization
World Meteorological Organization


INTEGRATED FLOOD MANAGEMENT TOOLS SERIES
TECHNICAL ASSISTANCE FOR
THE PREPARATION OF AN
ADVOCACY STRATEGY
ISSUE 24
DECEMBER 2015
Global Water Partnership
World Meteorological Organization



Choose your variable: Temperature and Rainfall

Choose your time period: 1901-2015



It is important to evaluate how climate has varied and changed in the past. The monthly mean historical rainfall and temperature data can be mapped to show the baseline climate and seasonality by month, for specific years, and for rainfall and temperature. The chart above shows mean historical monthly temperature and rainfall for Korea, Republic of during the time period 1901-2015. The dataset was produced by the Climatic Research Unit (CRU) of University of East Anglia (UEA).

Click to download historical data.

ClimatView - a tool for viewing monthly climate data

The ClimatView tool enables viewing and downloading of monthly world climate data, including monthly temperature/precipitation statistics and 30-year climate normals. Data are available for the period since June 1982, when JMA started receiving CLIMAT messages. Click on a station to see the relevant monthly data chart.

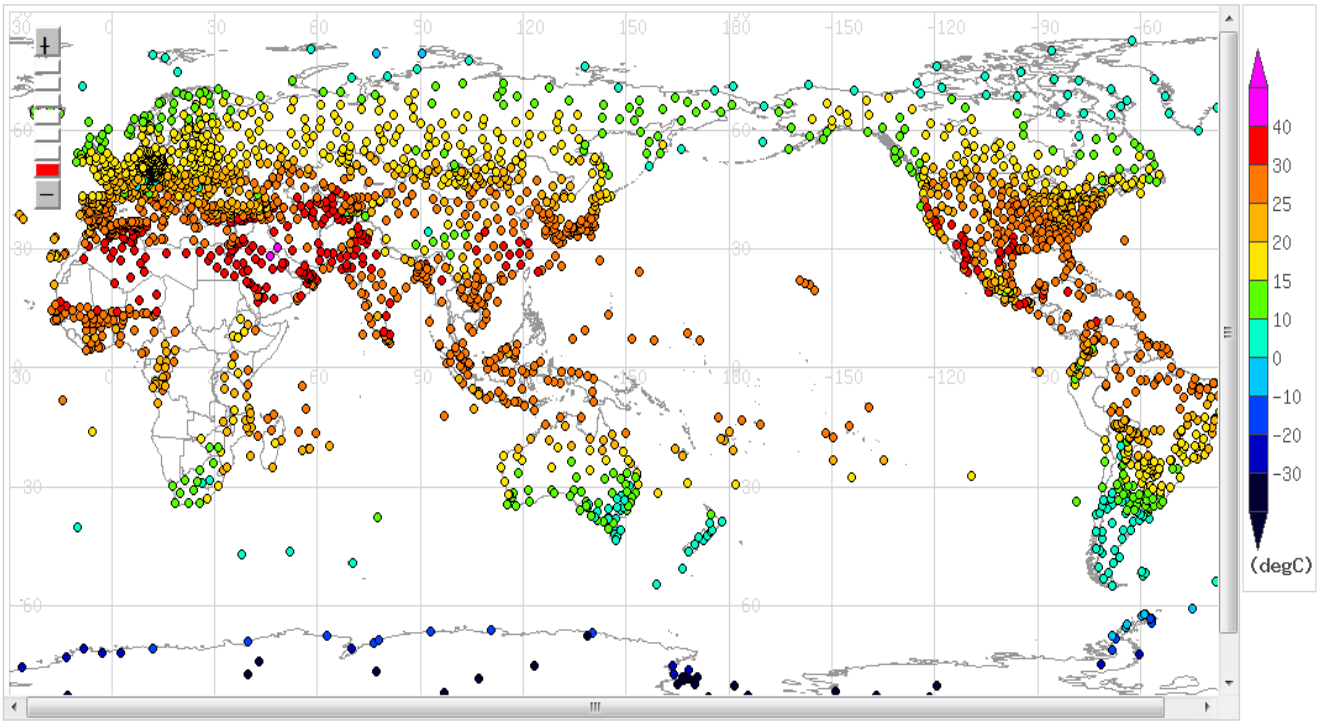
Outline of ClimatView If this website is slow, check this page.

♦Search Form

Region: Southeast Asia/Oceania Element: Mean Temp. Anomaly Year/Month << < 1982 1 > >> Map Reso. High Low Show

Data List » Printable » Click the "Show" button to reflect elements selected via the drop-down lists and radio button.

2017-07: [Mean Temp.(degC)



WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Thank you
Merci

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World Meteorological Organization
Organisation météorologique mondiale

GFCS
GLOBAL FRAMEWORK FOR CLIMATE SERVICES