

## SECOND WORKSHOP ON ASEAN REGIONAL CLIMATE DATA, ANALYSIS AND PROJECTIONS (ARCDAP-2)

25 - 29 March 2019, Village Hotel Albert Court, Singapore

Day 1: Monday, 25th of March 2019		
<b>Welcome and Introduction</b>		
		<b>Chair: Dr Thea Turkington</b> <b>Notetaker: Mr Raizan Rahmat</b>
08:00 - 09:00	1.1 Registration	
09:00 - 09:50	1.2 Welcome Address - Director, CCRS, Singapore	Dr Erland Källén (Centre for Climate Research Singapore - CCRS)
	1.3 Opening Address - Director, WMO Regional Office for Asia and the South-West Pacific (RAP)	Dr Chung Kyu Park (World Meteorological Organisation - WMO)
	1.4 Introduction to the WMO Climate Services Information System - WMO, Geneva	Ms Anahit Hovsepian (World Meteorological Organisation - WMO)
	1.5 Workshop Overview and Objectives - CCRS, Singapore	Dr Bertrand Timbal (Centre for Climate Research Singapore - CCRS)
09:50 - 10:20	Group Photo and Coffee Break	
<b>Presentations by NMHSs (Continental and Maritime SEA)</b>		
		<b>Chair: Dr Thea Turkington</b> <b>Notetaker: Mr Raizan Rahmat</b>
10:20 - 10:35	1.6 Cambodia: Department of Meteorology	Mr Monichoth So Im & Ms Dalin Chea
10:35 - 10:50	1.7 Laos: Department of Meteorology and Hydrology	Mr Sengduangduan Phouthanoxay & Mr Bounteum Sysouphanthavong
10:50 - 11:05	1.8 Myanmar: Department of Meteorology and Hydrology	Dr Tin Mar Htay
11:05 - 11:20	1.9 Thailand: Thai Meteorological Department	Dr Chalump Oonariya & Ms Nichanun Trachow
11:20 - 11:35	1.10 Vietnam: Viet Nam Meteorological and Hydrological Administration	Mr Nguyen Duc Hoa & Mrs Pham Thi Cham
11:35 - 11:50	1.11 Brunei: Brunei Darussalam Meteorological Department	Mr Arifin Yussof & Mr Izzat Ibrahim
11:50 - 12:50	Lunch	
<b>Presentations by NMHSs (Maritime SEA), Introduction and Installation of ClimPACT2</b>		
		<b>Chair: Dr Jian-Hua (Joshua) Qian</b> <b>Notetaker: Mr Raizan Rahmat</b>
12:50 - 13:05	1.12 Malaysia: Malaysian Meteorological Department	Ms Wan Maisarah Wan Ibadullah
13:05 - 13:20	1.13 Philippines: Philippine Atmospheric, Geophysical and Astronomical Services Administration	Ms Thelma A. Cinco & Ms Rosalina G. De Guzman
13:20 - 13:35	1.14 Singapore: Meteorological Service Singapore	Mr Ng Jin Zheng & Mr Tan Wee Leng
13:35 - 13:55	1.15 Introduction to ClimPACT2 <i>Overview: features of software, required inputs, and outputs</i>	Dr Nicholas Herold <i>(New South Wales Office of Environment and Heritage)</i>
13:55 - 14:40	1.16 Installation of ClimPACT2 software package and dependencies <i>Guided installation of ClimPACT2, R, and Panoply, if not already installed</i>	Dr Nicholas Herold and NMHS Representatives <i>(New South Wales Office of Environment and Heritage)</i>
14:40 - 15:10	Coffee Break	
<b>Hands-On Data Quality Control using ClimPACT2</b>		
		<b>Chair: ClimPACT2 Trainers</b> <b>Notetaker: Mr Raizan Rahmat</b>
15:10 - 16:10	1.17 Quality control with ClimPACT2 <i>Demonstration of the inefficiency of QC using Excel and the usefulness of ClimPACT's QC functionality</i>	Dr Cédric Van Meerbeeck <i>(Caribbean Institute for Meteorology and Hydrology - CIMH)</i>
16:10 - 18:00	1.18 Hands-on quality control of station data using ClimPACT2 <i>Guided quality control session, data to be formatted to RCLimDex format if required</i>	ClimPACT2 trainers and NMHS representatives <i>(NMHS representatives to be divided into country-specific groups)</i>
18:00	End of Day 1	
19:00	Dinner Reception at The Landmark Restaurant, Village Hotel Bugis	

## Day 2: Tuesday, 26th of March 2019

### Data Quality Control (Hands-On, Station Data) and Introduction to Homogeneity Assessment

Chair: Dr Bertrand Timbal  
Notetaker: Dr Thea Turkington

09:00 - 10:30	2.1	Hands-on quality control of data using ClimPACT2 (continued) <i>Guided quality control of station data brought by participants</i>	ClimPACT2 trainers and NMHS representatives <i>(NMHS representatives to be divided into country-specific groups)</i>
10:30 - 11:00	2.2	Introduction to homogeneity assessment <i>Concept of homogenisation, why it is necessary, and overview of available software</i>	Dr Lisa Alexander <i>(Climate Change Research Centre, UNSW Sydney)</i>
11:00 - 11:30	Coffee Break		

### Extreme Indices - Experts' and End-Users' Perspectives

Chair: Dr Bertrand Timbal  
Notetaker: Dr Thea Turkington

11:30 - 11:55	2.3	Impact of heat on human productivity and health - holistic assessment of thermal stress	Dr Jason Kai Wei Lee <i>(National University of Singapore - NUS)</i>
11:55 - 12:20	2.4	Weather extremes and water and food security: A case study in Thailand	Dr Kanoksri Sarinnapakorn <i>(Hydro and Agro Informatics Institute - HAI)</i>
12:20 - 12:45	2.5	Climate extreme indices and adaptation in the Mekong River Commission	Dr Nguyen Dinh Cong <i>(Mekong River Commission - MRC)</i>
12:45 - 13:45	Lunch		

### Demonstration of ClimPACT2 and Hands-On Application of ClimPACT2 to Station Data

Chair: Dr Bertrand Timbal  
Notetaker: Dr Thea Turkington

13:45 - 14:15	2.6	Calculation of ET-SCI indices using ClimPACT2 and station data <i>Demonstration: using ClimPACT2 to calculate ET-SCI indices from station data</i>	Dr Nicholas Herold <i>(New South Wales Office of Environment and Heritage)</i>
14:15 - 17:30	2.7	Hands-on calculation of indices using ClimPACT2 <i>Guided application of ClimPACT2 to station data for calculation of ET-SCI indices</i>	ClimPACT2 trainers and NMHS representatives
15:00 - 16:30	Flexible Coffee Break (participants may leave the room for snacks and drinks as they prefer)		
17:30	End of Day 2		

### Day 3: Wednesday, 27th of March 2019

#### Gridded Observational and Reanalysis Products - Producers' Perspectives

Chair: Dr Srivatsan Vijayaraghavan  
Notetaker: Dr Muhammad Eeqmal Hassim

09:00 - 09:30	3.1	ERA-Interim and ERA5 [remote presentation] <i>Overview, strengths, weaknesses, validation, extremes, and large-scale processes</i>	Dr Jean-Noël Thépaut <i>(European Centre for Medium-Range Weather Forecasts - ECMWF)</i>
09:30 - 10:00	3.2	Monitoring weather and climate with the CMORPH satellite precipitation estimates <i>Overview, strengths, weaknesses, validation, extremes, and large-scale processes</i>	Dr Pingping Xie <i>(National Oceanic and Atmospheric Administration - NOAA)</i>
10:00 - 10:30	3.3	The ACRE & ACRE-SEA initiative: Global historic data recovery for climate science & applications <i>ACRE, ACRE-SEA, and the importance of historical data and data digitalisation</i>	Dr Fiona Williamson <i>(Singapore Management University - SMU)</i>
10:30 - 11:00	Coffee Break		

#### Gridded Products: Strengths, Weaknesses, and Large-Scale Processes - End-Users' Perspectives

Chair: Dr Fiona Williamson  
Notetaker: Dr Muhammad Eeqmal Hassim

11:00 - 11:30	3.4	How good are gridded rainfall observations over Southeast Asia - and what's the way forward? <i>Assessment of observational and reanalysis rainfall products relevant to the region</i>	Dr Srivatsan Vijayaraghavan <i>(Tropical Marine Science Institute - TMSI)</i>
11:30 - 12:00	3.5	Large-scale processes in gridded products <i>Representation of regional processes such as monsoons, MJO, and ENSO in various products</i>	Dr Nguyen Dang-Quang <i>(Center for Hydro-Meteorological Technology Application - HYMETEC)</i>
12:00 - 12:30	3.6	Multi-scale climate processes and rainfall variability in the Maritime Continent <i>Using gridded products to analyse the impacts of MJO and ENSO on regional rainfall variability</i>	Dr Jian-Hua (Joshua) Qian <i>(Centre for Climate Research Singapore - CCRS)</i>
12:30 - 13:30	Lunch		

#### Extreme Indices and Gridded Products

Chair: Ms Li-Sha Lim  
Notetaker: Dr Muhammad Eeqmal Hassim

13:30 - 14:00	3.7	The CLIMDEX project and HadEX3 dataset <i>Overview, importance of HadEX3 dataset, and the need for data contributions</i>	Dr Lisa Alexander <i>(Climate Change Research Centre, UNSW Sydney)</i>
14:00 - 15:00	3.8	Gridded ET-SCI indices with ClimPACT2 <i>Software required and procedure, overview of gridded dataset used for pre-calculation</i>	Dr Nicholas Herold <i>(New South Wales Office of Environment and Heritage)</i>
15:00 - 15:30	3.9	Hands-on analysis of ET-SCI indices calculated from a gridded product <i>Participants to be provided with several pre-calculated indices</i>	Dr Nicholas Herold <i>(New South Wales Office of Environment and Heritage)</i>
15:00 - 15:30	Flexible Coffee Break (participants may leave the room for snacks and drinks as they prefer)		

#### Visit to InterMET Asia

15:30 - 16:00	3.10	Board shuttle and travel to InterMET Asia <i>Shuttle service from Village Hotel Albert Court to Suntec City Convention &amp; Exhibition Centre</i>	
16:00 - 17:00	3.11	Tour of the InterMET Asia Exhibition	
17:00 - 18:00	3.12	Panel discussion: Public Sector - Commercial Services? <i>Topics to include: understanding customer needs and funding of public sector services</i>	Moderator: Dr David Rogers (Consultant, World Bank) <i>Participants to include: Peter Lennox, Patrick Benichou, Michael Staudinger</i>
18:00 - 19:30	3.13	Official Reception and Dinner <i>Hosted by Earth Networks and InterMET Asia, to be held at the Delegate Lounge</i>	
19:30 - 20:00	3.14	Board shuttle and travel back to hotel <i>Shuttle service from Suntec City Convention &amp; Exhibition Centre to Village Hotel Albert Court</i>	
20:00	End of Day 3		

## Day 4: Thursday, 28th of March 2019

### ClimPACT2 and Gridded Data - Assessing Pre-Calculated Indices

Chair: Ms Li-Sha Lim

09:00 - 11:00	4.1	Exploration of indices pre-calculated from a gridded dataset <i>Analysis of pre-calculated indices, with comparison to station-derived indices if possible</i>	ClimPACT2 trainers and NMHS representatives
11:00 - 11:30	Coffee Break		
<b>Example of a ClimPACT Study, Preparation of Presentations Using Results from Day 2 and Day 4</b>			
Chair: ClimPACT2 trainers Notetaker: Dr Jian-Hua (Joshua) Qian			
11:30 - 12:00	4.2	Examples of studies and applications supported by ClimPACT2 <i>Climate indices for operational monitoring and prediction of climate hazards and impacts in the Caribbean</i>	Dr Cédric Van Meerbeeck <i>(Caribbean Institute for Meteorology and Hydrology - CIMH)</i>
12:00 - 13:45	4.3	Preparation of country-based presentations on results, writing of short summary <i>Results from ClimPACT sessions (station and gridded), learning outcomes, software feedback</i>	NMHS representatives
13:45 - 14:45	Lunch		
<b>Presentations by NMHSs (Continental SEA)</b>			
Chair: ClimPACT2 trainers Notetaker: Dr Jian-Hua (Joshua) Qian			
14:45 - 15:00	4.4	Cambodia: Department of Meteorology	Mr Monichoth So Im & Ms Dalin Chea
15:00 - 15:15	4.5	Laos: Department of Meteorology and Hydrology	Mr Sengduangduan Phouthanoxay & Mr Bounteum Sysouphanthavong
15:15 - 15:30	4.6	Myanmar: Department of Meteorology and Hydrology	Dr Tin Mar Htay
15:30 - 15:45	4.7	Thailand: Thai Meteorological Department	Dr Chalump Oonariya & Ms Nichanun Trachow
15:45 - 16:00	4.8	Vietnam: Viet Nam Meteorological and Hydrological Administration	Mr Nguyen Duc Hoa & Mrs Pham Thi Cham
16:00 - 16:30	Coffee Break		
<b>Presentations by NMHSs (Maritime SEA)</b>			
Chair: ClimPACT2 trainers Notetaker: Dr Jian-Hua (Joshua) Qian			
16:30 - 16:45	4.9	Brunei: Brunei Darussalam Meteorological Department	Mr Arifin Yussof & Mr Izzat Ibrahim
16:45 - 17:00	4.10	Malaysia: Malaysian Meteorological Department	Ms Wan Maisarah Wan Ibadullah
17:00 - 17:15	4.11	Philippines: Philippine Atmospheric, Geophysical and Astronomical Services Administration	Ms Thelma A. Cinco & Ms Rosalina G. De Guzman
17:15 - 17:30	4.12	Singapore: Meteorological Service Singapore	Mr Ng Jin Zheng & Mr Tan Wee Leng
17:30	End of Day 4		

**Day 5: Friday, 29th of March 2019****Conclusion - ClimPACT2**Chair: ClimPACT2 trainers  
Notetaker: Ms Li-Sha Lim

09:00 - 10:30 5.1 Plenary discussion on ClimPACT2  
*Summary: quality control features of ClimPACT2, importance of homogenisation, calculation of ET-SCI indices*  
*Group discussions (20 minutes): ClimPACT2 evaluations and recommendations, comparison between station-derived and grid-derived indices*  
*Conclusion: consolidation of thoughts from focus groups by ClimPACT2 trainers*

10:30 - 11:00 Coffee Break

**Conclusion - Extreme Indices**Chair: Dr Lisa Alexander  
Notetaker: Ms Li-Sha Lim

11:00 - 12:30 5.2 Plenary discussion on extreme indices  
*Outline of upcoming paper: presentation of key points to be included in the upcoming scientific paper on extreme indices*  
*Group discussions (20 minutes): thoughts on paper, needs highlighted by sector experts that need to be addressed in each country, directions for future research*  
*Conclusion: consolidation of thoughts from focus groups by lead author(s) of the extreme indices paper, with changes to outline if necessary*

12:30 - 13:30 Lunch

**Conclusion - Gridded Products (Strengths and Weaknesses)**Chair: Mr Raizan Rahmat & Representative for Dr Srivatsan Vijayaraghavan  
Notetaker: Ms Li-Sha Lim

13:30 - 15:00 5.3 Plenary discussion on gridded products (ERA-Interim, ERA5, CMORPH)  
*Outline of upcoming paper: strengths, weaknesses, and validation studies done on various gridded products*  
*Group discussions (20 minutes): preference within the ASEAN NMHSs for certain products and why (where the strengths of various products lie)*  
*Conclusion: consolidation of thoughts from focus groups by lead author(s) of the gridded products paper, with changes to outline if necessary*

15:00 - 15:30 Coffee Break

**Conclusion - Representation of Large-Scale Processes in Gridded Products**Chair: Dr Nguyen Dang-Quang & Dr Bertrand Timbal  
Notetaker: Ms Li-Sha Lim

15:30 - 17:00 5.4 Plenary discussion on the representation of regional large-scale processes in gridded products (MJO, ENSO, monsoons, etc.)  
*Outline of upcoming paper: strengths and weaknesses of various products in representing large-scale processes, directions for future research*  
*Group discussions (20 minutes): experience of ASEAN NMHSs in using gridded products to analyse large-scale processes*  
*Conclusion: consolidation of thoughts from focus groups by lead author(s) of the large-scale processes paper, with changes to outline if necessary*

17:00 Conclusion of Workshop