

Introduction and overview: Collaboration between EarthCARE and modeling, and global storm-resolving analysis

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ICCP-GSRA Workshop 2023, jointly with 2nd EarthCARE Modeling Workshop for improving cloud and radiation of climate models. 27-29 March, 2023, Hotel Laforet Shuzenji, Japan

<https://dpo.aori.u-tokyo.ac.jp/dmmg/ICCP-GSRA/ws2023.html>



ICCP-GSRA

International Core-to-Core Project on Global Storm Resolving Analysis

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Related informations

ICCP-GSRA Workshop 2023, jointly with The 2nd EarthCARE Modeling Workshop

ICCP-GSRA Workshop 2023, jointly with the 2nd EarthCARE Modeling Workshop for improving cloud, convection and radiation of global models

- Dates: 27(Mon)-29(Wed), March, 2023
- Venue: Hotel Laforet Shuzenji <https://www.laforet.co.jp/en/szj/> about 3-4 hours from Haneda/Narita Airports by train
- Organizers: Masaki Satoh, Kenta Suzuki, Tomoki Miyakawa, Bjorn Stevens, Hajime Okamoto, Takuji Kubota
- Jointly hosted by JAXA; Kyushu Univ; Research Institute for Applied Mechanics (RIAM), Kyushu Univ.; AORI, The University of Tokyo

<https://dpo.aori.u-tokyo.ac.jp/dmmg/ICCP-GSRA/ws2023.html>

Objectives of the workshop

- ❑ This workshop is intended to enhance activities of the cutting-edge atmospheric climate and weather models, including “K-scale” or global storm-resolving models and their collaboration with the EarthCARE satellite.
- ❑ The EarthCARE satellite is scheduled to be launched in April 2024, with the first-ever global observations of the vertical motion of cloud particles from space (by CPR Doppler measurement). On the occasion of a year prior to the launch, we would like to invite modeling scientists to discuss possible directions and areas of collaboration between the EarthCARE satellite and modeling communities for advancing model representations of cloud and convection physics. We also aim to facilitate the ongoing discussions of NASA AtmOS, which is planned for launch around 2030.
- ❑ This workshop is jointly hosted by International Core-to-Core Project on Global Storm Resolving Analysis (ICCP-GSRA), which enhances activities for promoting international collaboration for global storm-resolving meteorological data analysis and their social implementation.



EarthCARE satellite

Launch: 2024



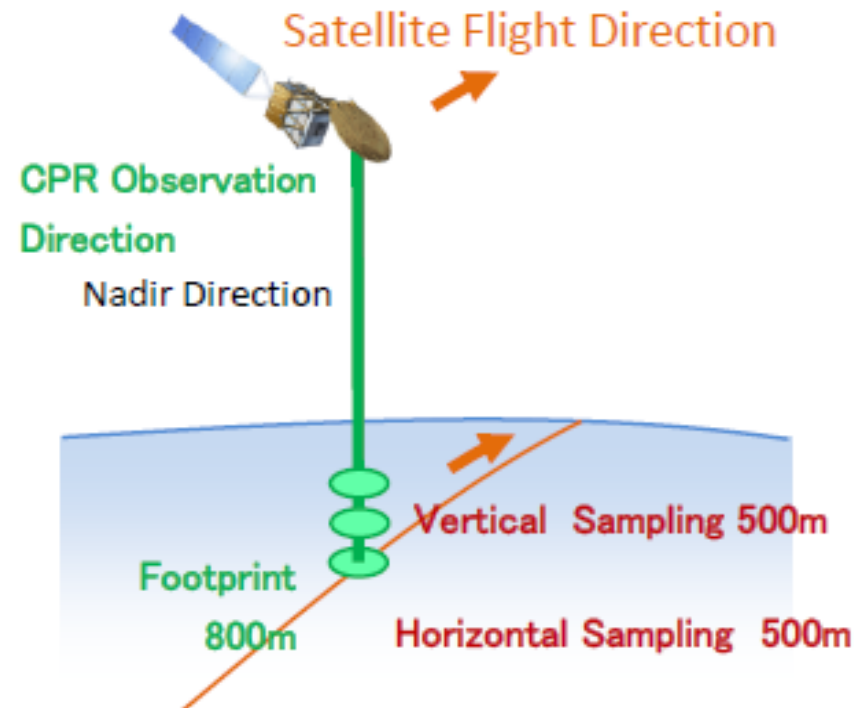
Illingworth et al. (2015, BAMS)

CPR

Cloud Profiling Radar

The World's First Satellite-borne Doppler Cloud Radar

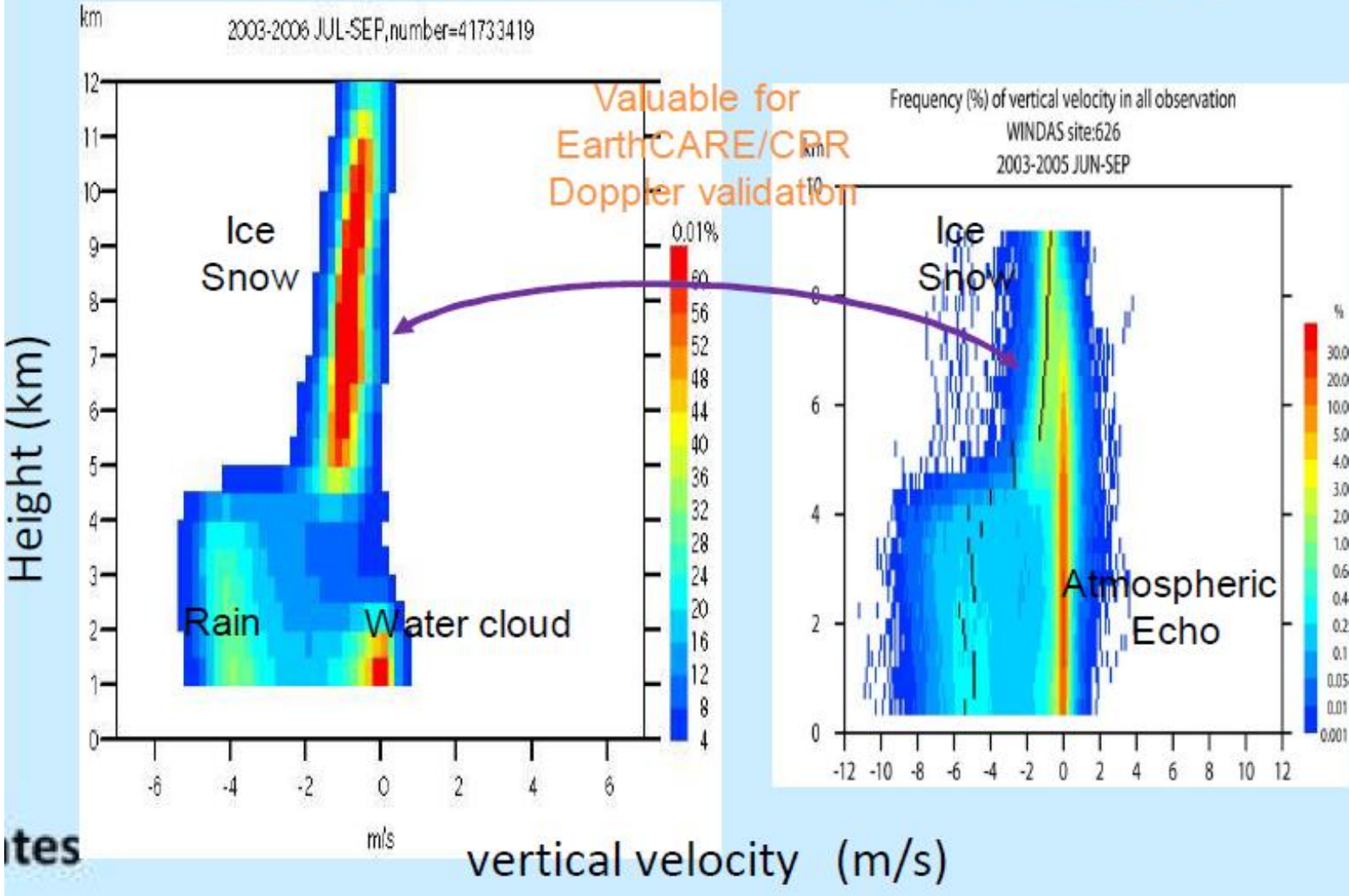
CPR is a **94 GHz (W-band) Doppler Radar** jointly developed by Japan Aerospace Exploration Agency (JAXA) and National Institute of Information and Communications Technology (NICT).



Echo appearances (SPIDER & WINDAS)

SPIDER (Koganei)

WINDAS (Kumagaya)

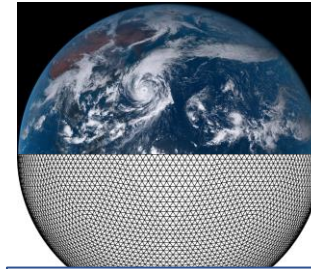


全球^{ストーム}嵐解像解析の国際拠点形成

International Core-to-Core Project on Global Storm Resolving Analysis

"Promoting international collaboration for global storm-resolving meteorological data analysis and social implementation"

- ❑ Promotion of international comparison experiment of "Global Storm Resolution Model" simulation DYAMOND project
- ❑ Social Implementation of Digital Twins/Digital Earths Using "Global Storm Resolution Data" Virtual Reality Weather Data and Observation Big Data
- ❑ Monitoring and forecasting extreme weather events such as typhoons and torrential rains, and preparing for the threat of global warming: Contributing to weather and climate forecasting in current business

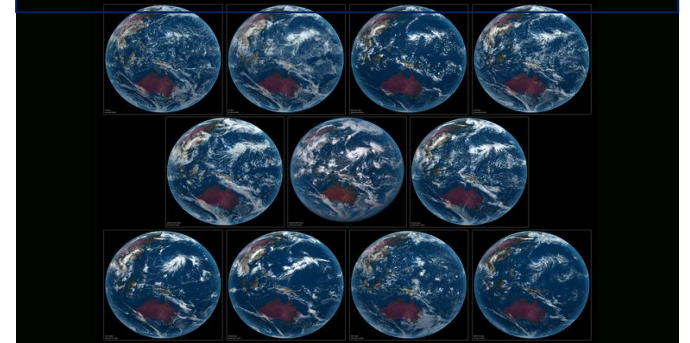


A global storm-resolving model covering the earth with a km mesh

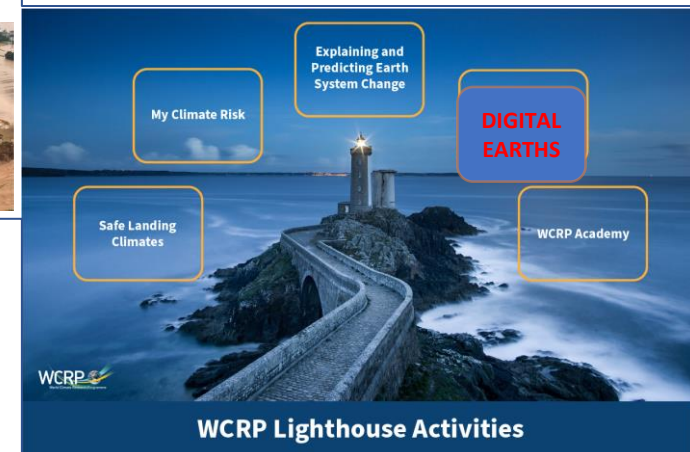


The threat of extreme weather events such as typhoons and torrential rains is increasing due to global warming: **Contributing to weather and climate prediction and disaster prevention**

DYAMOND project: Cloud images from each country's model in the international comparison experiment of global storm-resolving models



World Climate Programme WCRP Next Project: Lighthouse Activity/DIGITAL EARTHS



Japan: Masaki Satoh (Utokyo)

Atmosphere and Ocean Research Institute,
The University of Tokyo
Japan Agency for Marine-Earth Science and
Technology
RIKEN

National Institute for Environmental Studies

Germany: Bjorn Stevens (MPI-M)

EU HORIZON2020 "NextGEMS"
BMBF project "WarmWorlds"
Destination Earth

Max Planck Institute for
Meteorology

United States: David Randall (CSU)

NSF project "EarthWorks".

Colorado State University

National Center for Atmospheric
Research

UK: Pier Luigi Vidale (Reading U)
NERC projects "EERIE" + "Huracán"
+ "REPRESA"

National Centre for Atmospheric
Science, University of Reading

Purposes of ICCP-GSRA

- Promotion of international comparison experiment of "Global Storm Resolution Model" simulation DYAMOND project**
- Social Implementation of Digital Twins/Digital Earths Using "Global Storm Resolution Data" Virtual Reality Weather Data and Observation Big Data**
- Monitoring and forecasting extreme weather events such as typhoons and torrential rains, and preparing for the threat of global warming: Contributing to weather and climate forecasting in current business**

		Japan	United Kingdom	Germany	America
☐ 2022	<p><u>kickoff</u></p> <p>Start of project collaboration, DYAMOND data analysis, formulation of new DYAMOND, Digital Earth collaboration</p>	seminar	meeting	seminar	meeting
☐ 2023	<p><u>project promotion</u></p> <p>Linkage analysis of DYAMOND/Digital Earth data, progress of new DYAMOND, study of social implementation (weather and climate prediction)</p>	Seminar for Young Researchers	seminar	Residence of young researchers at overseas sites	seminar
☐ 2024	<p><u>midterm review</u></p> <p>DYAMOND/Digital Earth collaborative analysis, progress of new DYAMOND, promotion of social implementation</p>	seminar	Residence of young researchers at overseas sites	seminar	Residence of young researchers at overseas sites
☐ 2025	<p><u>Toward Post Core-to-Core Study</u></p> <p>New DYAMOND/Digital Earth collaborative analysis, social implementation promotion, and</p>		seminar	Seminar for Young Researchers hackathon	seminar
☐ 2026	<p><u>Final Review</u></p> <p>Establishment of new DYAMOND/Digital Data data linkage, advocacy of DYAMOND-NEXT, succession of future project promotion</p>	seminar	Seminar for Young Researchers	seminar	meeting

Primary scopes of discussions

- Collaboration with EarthCARE and modeling
- How to use EarthCARE and other observational data to improve models
- Future activities of global storm-resolving analysis (GSRA), including new proposals of inter-comparison of Global Storm Resolving Models
- Cloud and convective processes revealed by the EarthCARE and modeling collaboration
- Innovative analysis of cloud and convective systems
- New aspects of satellite simulator approaches

Time table/Agenda

- 27 March 2023 (Mon) 13:00-18:00
 - ☐ Introduction talks
 - ☐ Simulators, evaluations
 - ☐ Poster flash talks [01-10] and viewing
 - Ice break
- 28 March 2023 (Tue) 8:30-18:00
 - ☐ GSRMs
 - Lunch
 - ☐ Poster flash talks [11-20] and viewing
 - ☐ Process studies
 - Banquet
- 29 March 2023 (Wed) 8:30-14:30
 - ☐ Process analysis/modeling (cont.)
 - ☐ GCMs
 - Lunch
 - ☐ Wrap-up
 - End of the workshop 14:30
 - Excursion to the Shuzenji-Onsen 15:00-18:30
- 30 March 2023 (Thu) 9:00-12:00
 - ☐ ICCP-GSRA core meeting

Rapporteurs

- GSRMs: Ryusuke Masunaga, Koryu Yamamoto
 - GCMs: Tsuyoshi Koshiro, Takuro Michibata
 - Process Studies: Clara Bayley, Tatusya Seiki
 - Simulators: Yuhi Nakamura, Takamichi Iguchi
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- 29 March 2023, 13:00-14:30

Rapporteurs report in the wrap-up session.

Future Schedule

- International Nonhydrostatic Modeling Workshop, Aug. 31- Sep. 2, Sapporo, Japan (supported by ICCP-GSRA)
- EarthCARE Pre-Launch Science and Validation Workshop, 13-17 November, 2023, Italy
- EarthCARE launch: April 2024
- 3rd EarthCARE-Modeling Workshop 2024 (plan)
- Next 5 years plan of GSRA and related meetings/workshops:
 - CFMIP2023, The Berlin Summit, etc