

Information on the ninth meeting of the research dialogue

Note by the Chair of the SBSTA

18 April 2017

I. Introduction

1. As requested by the Subsidiary Body for Scientific and Technological Advice (SBSTA) at their twenty sixth session, the secretariat will organize annual meetings of the research dialogue in collaboration with invited research programmes and organizations to inform the SBSTA of developments in research activities relevant to the needs of the Convention.¹
2. At their forty-fourth meeting (SBSTA 44), the SBSTA noted the importance of addressing regional climate research and data needs. It encouraged relevant research programmes and organizations to present their efforts to identify relevant climate research and data information and gaps, including activities they are undertaking such as regional workshops, at this year's meeting of the research dialogue.²
3. The SBSTA invited Parties to submit their views on possible topics for consideration at this session's meeting of the research dialogue and beyond, taking into account the encouragement referred to in paragraph 2 above³ and the themes and presentations already addressed at previous meetings and those suggested for future meetings.⁴
4. Submissions⁵ were received from:
 - (a) Malta and the European Commission on behalf of the European Union and its member States. This submission is supported by Albania, Bosnia and Herzegovina and Serbia;
 - (b) Japan;
 - (c) Russian Federation;
 - (d) Turkey.
5. The eighth meeting of the research dialogue (RD 8) held at SBSTA 44 focussed on 2 themes: 1) the scientific analysis of pathways for achievement of the "well below 2 °C" global temperature goal and limiting the temperature increase to 1.5 °C, including global and regional transformation pathways and related impacts and 2) the risks and impacts of slow-onset events as a result of climate change.⁶ The summary report of the eighth meeting is available online.⁷

II. Ninth meeting of the research dialogue

A. Background

Relevant UNFCCC mandates and activities

6. The foundation for the research dialogue was given in decision 9/CP.11⁸ and the focus identified at SBSTA 26.⁹ Relevant research programmes and organizations were invited to regularly inform the SBSTA of: emerging scientific findings; research planning activities, priorities and gaps and capacity building activities particularly in developing countries; regional climate change research networks; and relevant communication issues. The Conference of the Parties (COP) decision 16/CP.17¹⁰ urges Parties, in particular developing country

¹ FCCC/SBSTA/2007/4, paragraph 47.

² FCCC/SBSTA/2016/2, paragraph 34.

³ FCCC/SBSTA/2016/2, paragraph 35.

⁴ See Annex I of the information note for the eighth meeting of the research dialogue <http://unfccc.int/files/science/workstreams/research/application/pdf/researchdialogue.2016.1.informationnote.pdf>.

⁵ All submissions available at <http://unfccc.int/5900>.

⁶ See <http://unfccc.int/9475>.

⁷ See http://unfccc.int/files/science/workstreams/research/application/pdf/researchdialogue_2016_2_summaryreport.pdf.

⁸ FCCC/CP/2005/5/Add.1, pages 19–20.

⁹ FCCC/SBSTA/2007/4, paragraph 47.

¹⁰ FCCC/CP/2011/9/Add.2, page 47.

Parties, and invites regional and international research programmes and organizations active in climate change research to utilize the research dialogue as a forum for discussing needs for climate change research and research-related capacity-building, particularly those of developing countries and conveying research findings and lessons learned from activities undertaken by regional and international research programmes and organizations. Annex I provides a table of themes and presentations from all meetings of the research dialogue.

7. The Convention Calls on Parties to **promote and cooperate** in research, systematic observation and the development of data archives, including through exchange of information; to support programmes, networks and organizations; and improve the capacities of developing countries.¹¹ The Paris Agreement recognizes the need for “effective and progressive response to the urgent threat of climate change on the basis of the **best available scientific knowledge**”.¹²

8. The Paris Agreement requires all Parties to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels. Parties best efforts are identified in their nationally determined contributions (NDCs). Parties will take stock of progress on an ongoing basis including: the 2018 facilitative dialogue to take stock of the collective efforts in relation to progress towards the mitigation goal in Article 4.1 of the Paris Agreement and to inform the preparation of NDCs;¹³ and the global stocktake to assess all collective progress towards the implementation of the Paris Agreement, that will be finalized in 2023 and taking place every 5 years thereafter.¹⁴

9. Article 7 of the Paris Agreement identifies that “Parties should strengthen their cooperation on enhancing action on adaptation, taking into account the Cancun Adaptation Framework, including with regard to: [...] a) sharing information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies and implementation in relation to adaptation actions; b) strengthening institutional arrangements, including those under the Convention that serve this Agreement, to support the synthesis of relevant information and knowledge, and the provision of technical support and guidance to Parties; c) strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making [...]”

10. The Least Developed Countries (LDC) Expert Group (LEG), as part of its 2016–2017 work programme,¹⁵ is conducting a series of five regional training workshops on National Adaptation Plans (NAPs) with the support of the NAP technical working group and in collaboration with relevant organizations, regional centres and networks. The first of the current series of workshops took place for Anglophone Africa in Malawi in February 2017. Further workshops will take place in 2017 in Asia (tentative: 12 to 14 June), Pacific islands (10 to 13 July), America and the Caribbean (Costa Rica, 22 to 25 August), and Francophone Africa (31 July to 4 August).

11. Regional- and national-level climate information and downscaling and capacity to understand the actual and projected state of the climate system and use data and models, including from national hydrometeorological services, is an important part of NAP preparation and development.¹⁶ This includes the use of information for assessing health risks and welfare of the population, economic entities and infrastructure of countries. The 2017 LEG report details the Integrative Framework for National Adaptation Plans and Sustainable Development Goals (NAP-SDG iFrame) and identifies the importance of building adequate and lasting technical capacity beyond institutional strengthening for long-term research and education, so as to further the process to formulate and implement NAPs.¹⁷

Activities by key partners

World Climate Research Programme

12. The World Climate Research Programme (WCRP) facilitates the analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society. WCRP utilizes a multidisciplinary approach, organizing large-scale observational and modelling projects and providing an international forum to align the efforts of thousands of climate scientists working to provide the best possible climate information.

¹¹ UNFCCC Articles 4.1(g, h) and 5 <http://unfccc.int/6036>.

¹² <http://unfccc.int/9485>.

¹³ Decision 1/CP.21, paragraph 20.

¹⁴ Decision 1/CP.21, paragraph 99–101.

¹⁵ <http://unfccc.int/9516>.

¹⁶ See presentation by the representative of the LEG at the COP 22 Earth Information Day

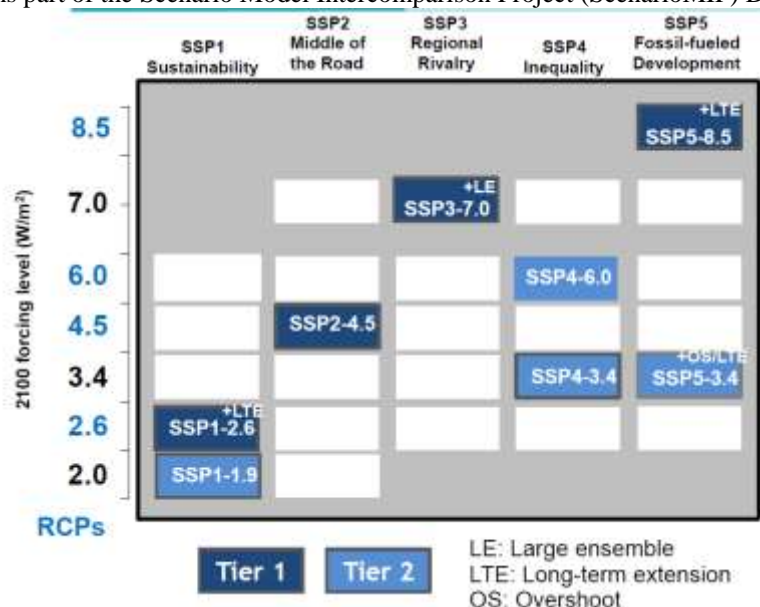
http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/ii.6_leg_fitzgerald.pdf.

¹⁷ FCCC/SBI/2017/6.

13. The WCRP-led Coupled Model Intercomparison Project (CMIP) has become one of the foundational elements of climate science.¹⁸ Since 1995, CMIP has coordinated climate model experiments involving multiple international modeling teams worldwide to advance scientific understanding of the Earth system and past, present and future climate change and variability in a multi-model framework. The scientific topics in CMIP are defined by the WCRP community and linked to the WCRP Grand Challenges.¹⁹ CMIP has been developed in phases and the outcome of the current and sixth phase, CMIP6, will provide a key input into the IPCC sixth assessment report. However, CMIP6 results will not be available for the IPCC special report on global warming of 1.5 degrees (see paragraphs 22–23 below).

14. The scientific community are engaged in a large number of activities to support CMIP6. This includes the Scenario Model Intercomparison Project (ScenarioMIP), the primary activity within CMIP6 that will provide multi-model climate projections based on alternative scenarios that are directly relevant to societal concerns regarding climate change impacts, mitigation and adaptation. These climate projections are driven by a new set of emissions and land use scenarios produced with integrated assessment models (IAMs)²⁰ based on new future pathways of societal development, the Shared Socioeconomic Pathways (SSPs), and related to the representative concentration pathways (RCPs) used during the IPCC fifth assessment cycle (figure 1).²¹ A new development for CMIP6 is the inclusion of an ultra-low emissions scenario (RCP2.0-SSP1), as requested at SBSTA 42.²²

Figure 1
 CMIP6 projections part of the Scenario Model Intercomparison Project (ScenarioMIP) Design



Source: Provided by Mr. David Carlson, Director of WCRP, on behalf of the CMIP community.

Note: The matrix shows the representative concentration pathways (RCPs) and shared socioeconomic pathways (SSPs) that will be undertaken in CMIP6 and the models that will be run at Tier 1 (>10 model runs by individual research groups) and Tier 2 (<10 model runs by individual research groups).²³

15. The High Resolution Model Intercomparison Project (HighResMIP v1.0) for CMIP6 applies, for the first time, a multi-model approach to the systematic investigation of the impact of horizontal resolution. Recent progress in computing power has enabled climate models to simulate more processes in detail and on a smaller scale. A coordinated set of experiments has been designed to assess both a standard and an enhanced horizontal resolution

¹⁸ See <https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6> and the Special Issue of the Geoscientific Model Development on the Coupled Model Intercomparison Project Phase 6 (CMIP6) Experimental Design and Organization http://www.geosci-model-dev.net/special_issue590.html.

¹⁹ <http://www.wcrp-climate.org/grand-challenges>.

²⁰ <http://www.iamconsortium.org>.

²¹ As described at RD 8 in the summary report

http://unfccc.int/files/science/workstreams/research/application/pdf/researchdialogue_2016_2_summaryreport.pdf and in the poster, *The shared socio-economic pathways (SSPs):*

An overview http://unfccc.int/files/science/workstreams/research/application/pdf/part1_iiasa_rogelj_ssp_poster.pdf.

See also <https://cmip.ucar.edu/scenario-mip> and <http://pure.iiasa.ac.at/13868/>.

²² FCCC/SBSTA/2015/2, paragraph 33 <http://unfccc.int/resource/docs/2015/sbsta/eng/02.pdf>.

²³ O'Neill et al. (2016). The Scenario Model Intercomparison Project (ScenarioMIP) for CMIP6, Geoscientific Model Development <https://doi.org/10.5194/gmd-2016-84>.

simulation in the atmosphere and ocean to provide robust projections and predictions of climate variability and change at regional scales. These runs will also serve as a more reliable source for assessing climate risks that are associated with small-scale weather phenomena, such as tropical cyclones.²⁴

16. The Decadal Climate Prediction Project (DCPP) for CMIP6²⁵ investigates the scientific community's ability to skilfully predict climate variations from a year to a decade ahead. It is part of the WCRP's grand challenge on near-term climate prediction.²⁶ The potential to make skilful forecasts on these timescales, and the ability to do so, is investigated by means of three components: retrospective forecasts (termed hind casts); forecasts of the climate system; and idealised experiments to understand the mechanisms and dynamics of decadal climate variability. In addition, the DCPP investigates how perturbations such as volcanoes affect forecasts and, more broadly, what new information can be learned about the mechanisms governing climate variations by means of case studies of past climate behaviour. Decadal climate prediction is a tool that will increasingly be able to provide fast, reliable climate information of near-term climate evolution and provide a basis for socially relevant operational predictions of climatic parameters on annual to decadal timescales. It is of relevance for adaptation planning and mitigation monitoring including to develop climate indicators to monitor and evaluate decisions on energy generation strategies and/or emission mitigation plans.

17. The WCRP Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP), an active MIP not part of CMIP6, is a community-driven climate-impacts modelling initiative aimed at contributing to a quantitative and cross-sectoral synthesis of the differential impacts of climate change, including the associated uncertainties. ISI-MIP offers a consistent framework for cross-sectoral, cross-scale modelling of the impacts of climate change, including those associated with 1.5 and 2 °C end of century warming, so as to contribute to the comprehensive understanding of the impacts of politically and scientifically-relevant climate-change scenarios.²⁷

18. The CMIP6 Vulnerability, Impacts, Adaptation and Climate Services (VIACS) Advisory Board facilitates communications between the CMIP community and the various communities applying climate change information for scientific or operational purposes. By formalizing this process and involving leaders from each community, the VIACS Advisory Board aims to enhance the societal benefit of climate information.²⁸

19. **Regionally focussed activities** in WCRP occur across a range of projects and activities.²⁹ This includes the WCRP-led coordinated regional climate downscaling experiment (CORDEX) to advance and coordinate the science and application of regional climate downscaling through global partnerships, including by providing consistency for regional projections, and guidance for use of these projections.³⁰ Regional downscaling is taking place in 14 continental-scale domains around the globe.³¹ Recent updates from the CORDEX community have been reported at the Earth Information Day³² and research dialogue,³³ such as the CORDEX-Africa African Climate Atlas.

20. Also at regional level, the WCRP Water for Food Baskets Grand Challenge has developed an effective working arrangement with the water resource management community to promote mutual attention to future water issues for food-providing regions of our planet. For the climate modelling community this collaboration represents recognition of the need to incorporate human features (reservoirs, diversions, drainage systems) into models of the water cycle and to develop high-resolution prediction capabilities suited to regional water supply situations. For the hydrology and water management community the partnership offers the opportunity to participate in the development of state-of-the-art projections of water sources and losses under well-documented future climate scenarios. The Water for Food Baskets Grand Challenge will devote initial attention to the Pannonian Basin of central Europe, the grain- and vegetable-producing regions of North America and the rice-growing regions of southeast Asia.

21. The climate science community have defined four **climate indicators** (budgets) that can be assembled and calibrated as indicators for the climate system: an annual global carbon budget focused on CO₂ and a global

²⁴ <https://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/modelling-wgcm-cmip6-endorsed-mips/index.php?t&view=article&id=1068>.

²⁵ <https://www.wcrp-climate.org/dcp-overview>.

²⁶ <https://www.wcrp-climate.org/grand-challenges/gc-near-term-climate-prediction>.

²⁷ <https://www.isimip.org> and see also the poster from RD 8,

Probabilistic assessment of impacts for low emission pathways – the potential of ISIMIP

http://unfccc.int/files/science/workstreams/research/application/pdf/part1_pik_frieler_isimip_poster.pdf.

²⁸ <https://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/modelling-wgcm-mips/160-unifying-themes/unifying-themes-modelling/modelling-wgcm/modelling-wgcm-cmip6/1067-modelling-cmip6-viacs>.

²⁹ <https://www.wcrp-climate.org/wcrp-regional-activities>.

³⁰ <http://www.cordex.org>.

³¹ <https://www.cordex.org/index.php/community/domains>.

³² <http://unfccc.int/9949>.

³³ <http://unfccc.int/9475>.

methane (CH₄) budget (both from Global Carbon Project³⁴ - a valued partner to WCRP); a global sea level budget; and a global Earth energy budget.³⁵

Intergovernmental Panel on Climate Change

22. The Intergovernmental Panel on Climate Change (IPCC) is now in its sixth assessment cycle. The IPCC Sixth Assessment Report (AR6) will be completed in 2022 and produced in conjunction with the following reports:

- (a) *Global warming of 1.5°C: an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5)*, in 2018;
- (b) *IPCC special report on oceans and cryosphere in a changing climate (SROCC)*, in 2019;
- (c) *Climate change and land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL)*, in 2019;
- (d) *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*, in 2019.

23. The IPCC panel adopted the outline of SR 1.5 in 2016.³⁶ The report will be considered as part of the facilitative dialogue in 2018.³⁷ In the longer term, IPCC assessments and reports will inform the global stocktake.³⁸ The SBSTA and the IPCC organized a joint event in May 2016 in order to better exchange views, based on the AR5, on what may be relevant for the global stocktake and what may be considered in the AR6. The summary report of this meeting is available online.³⁹

24. A conference on *1.5 degrees: meeting the challenges of the Paris Agreement* was organized on 20–22 September 2016, by the Environmental Change Institute, Oxford University, UK,⁴⁰ to contribute to the evidence base for the SR 1.5.

25. An IPCC expert meeting on mitigation, sustainability and climate stabilization scenarios will be held on 26–28 April 2017, in Addis Ababa. It will address two key challenges: 1) the need to assess the linkages between high-level climate stabilization goals and scenarios on the one hand and the practical steps needed in the short- and medium-term to make the realization of these goals possible; and 2) the need to anchor climate responses firmly in the context of development needs. Outcomes from the meeting will include a report to inform the assessment of scenarios, their communication and their interface with other forms of scientific investigation during the preparation of the WG III contribution to AR6 and the preparation of IPCC Special Reports (SR1.5, SRCCL), and recommendations for the scenario/modelling community and other scientific communities regarding useful lines of research that could enhance the contribution to the assessment of climate mitigation options, in the context of sustainable development, and communicate effectively with policymakers

Global Climate Observing System

26. The Global Climate Observing System (GCOS)⁴¹ 2016 implementation plan⁴² sets out implementation needs for the climate observation system. In decision 19/CP.22, the COP encourages Parties, UN agencies and international organizations to work towards the full implementation of the plan and to consider what actions they can take to contribute towards its implementation. The decision emphasizes the need to maintain, strengthen and build capacities for climate observations, monitoring and data management, including data rescue, digitization, analysis, archiving and sharing, and build capacity for systematic observations in developing countries through existing relevant mechanisms, including the GCOS Cooperation Mechanism.

27. As part of the plan GCOS is now developing, in collaboration with the observation and science community, a core set of **climate change indicators** as a basis for reporting climate change to stakeholders, including the public. There are two types of indicator being developed, the first and more straightforward are the **historical**

³⁴ <http://www.globalcarbonproject.org/carbonbudget/>.

³⁵ Sea level and energy budgets are described further in the COP 22 Earth Information Day report http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/earthinformationday.2016.1.summaryreport.pdf

³⁶ https://www.ipcc.ch/meetings/session44/12_adopted_outline_sr15.pdf.

³⁷ Decision 1/CP.21, paragraph 21.

³⁸ Decision 1/CP.21, paragraph 99–100.

³⁹ <http://unfccc.int/9535>.

⁴⁰ <http://www.1point5degrees.org.uk>.

⁴¹ <http://www.wmo.int/pages/prog/gcos/>.

⁴² http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/gcos_ip_10oct2016.pdf.

indicators (lagging indicators), describing the physical state of the climate system and its historical development. The second type of indicators, **future indicators (leading indicators)**, look at future impact, risk and adaptation.

28. At a regional level, as noted at SBSTA 45, there is a need for regional workshops, as identified by the GCOS implementation plan. The SBSTA invited GCOS to organize such workshops, taking into consideration the benefit of organizing these workshops in collaboration with relevant partners, including the UNFCCC secretariat and the IPCC.⁴³

World Meteorological Organization

29. The World Meteorological Organization (WMO) issued its annual statement on the state of the global climate on 21 March 2017.⁴⁴ WMO also prepared an interactive story map to highlight some of the main trends and events in 2016, including temperature anomalies at regional level.⁴⁵ The WMO will provide a statement on the state of the global climate to SBSTA 47, and annually thereafter, as requested at SBSTA 45.⁴⁶

30. WMO designated Regional Climate Centres (RCCs) are being implemented to generate and deliver more regionally-focused high-resolution data and products as well as training and capacity building. As centres of Excellence, the WMO RCCs create regional products including long-range forecasts that support regional and national activities and thereby strengthen capacity of WMO Members in a given region to deliver the best climate services to national users.⁴⁷ The WMO is implementing RCCs in close coordination with its Regional Associations and the Commission for Climatology (CCI),⁴⁸ which also plays a key role in implementation of the global framework for climate services. The CCI is advised and coordinated by the Implementation Coordination Team on the Climate Services Information System (ICT-CSIS).⁴⁹

31. In collaboration with GCOS, WMO will organise a side event at SBSTA 46 on the global stocktake and observing networks, indicators and essential climate variables.⁵⁰

Group on Earth Observations

32. The Group on Earth Observations (GEO)⁵¹ is creating a Global Earth Observation System of Systems (GEOSS)⁵² to better integrate observing systems and share data. GEOSS specifically targets: spatial and temporal gaps in data sets and eroding or scarce technical infrastructure in many parts of the world; global access to data and associated benefits; coordination of data integration and interoperability; support to processing systems to transform data into useful information; and strengthening user involvement. The GEOSS Common Infrastructure (GCI) links over 150 data catalogues containing over 200 million open Earth observation resources.

33. GEO is building **regional initiatives**, including AfriGEOSS (in Africa), AmeriGEOSS (in the Americas) and AOGEOSS (in Asia-Oceania), to support decision-making and regional sustainable development, and build institutional and individual capacity through engagement of experts, stakeholders and decision makers. For example, AfriGEOSS is leveraging the Africa Data Intensive Research Cloud (ADIRC), to provide researchers in African countries access to high performance computing (HPC) infrastructures, enabling them to take part in big data science projects and to build Earth observation data processing platforms.

34. The GEO Carbon and GHG Initiative (GEO-C) is developing a coordinated system of observations and evaluation of changes in the carbon cycle and greenhouse gas emissions.⁵³ GEO workshops and the annual international plenary ensure a sustained dialogue around the information needs of those seeking to integrate climate products and services into adaptation processes and decisions.⁵⁴ GEO is also working with the UN Statistical Office's Inter-agency expert group on sustainable development indicators (IAEG-SDGs) to address how Earth observations and geospatial information relate to monitoring and achieving the 2030 Agenda.

⁴³ FCCC/SBSTA/2016/4, paragraph 39.

⁴⁴ http://library.wmo.int/opac/doc_num.php?explnum_id=3414.

⁴⁵ <https://wmo.maps.arcgis.com/apps/Cascade/index.html?appid=37e7555ce4b1404da1ec2d49bb8b3588>.

⁴⁶ FCCC/SBSTA/2016/4, paragraph 43.

⁴⁷ <http://www.wmo.int/pages/prog/wcp/wcasp/rcc/rcc.php>.

⁴⁸ http://www.wmo.int/pages/prog/wcp/ccl/index_en.php.

⁴⁹ <http://www.wmo.int/pages/prog/wcp/ccl/ICT-CSIS.php>.

⁵⁰ https://seors.unfccc.int/seors/reports/events_list.html?session_id=SB46.

⁵¹ <http://www.earthobservations.org>.

⁵² <http://www.geoportal.org>.

⁵³ As described by the representative of GEO at the COP 22 Earth Information Day, see report paragraph 84–85

http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/earthinformationday.2016.1.summaryreport.pdf

⁵⁴ The GEO-XIII Plenary (November 2016) agreed on three priority engagement areas, including “Climate Change – Greenhouse Gas Monitoring” to support the implementation of the Paris Agreement. The GEO Executive Committee in March 2017 confirmed the focus on both adaptation and mitigation. <https://www.earthobservations.org/geo13.php>.

Data Centres

35. CMIP6 has a more complex experiment structure and finer spatial resolution than all previous phases of CMIP. As such, CMIP6 has a greatly increased data volume, a larger number of data entities and more complex external metadata. This vital data needs to be stored and managed in data distribution centers around the globe. The high-resolution data from CMIP6 should be available to users so as to support regional and national level decision making.

36. The Earth System Grid Federation⁵⁵ is the international US-led collaborative framework that develops, deploys and maintains software infrastructure for the management, dissemination, and analysis of model output and observational data. It is recognized as the leading infrastructure for the management and access of large distributed data volumes for climate change research including CMIP data, as well as reanalysis data and, increasingly, observational data, in support of research and development.

37. The IPCC is currently reviewing the role of the Task Group on Scenarios for Climate and Impact Assessment (TGICA),⁵⁶ which coordinates its own Data Distribution Centre providing access to data and information from the IPCC assessment reports.⁵⁷ As part of the review of the TCCIA, a mapping exercise identified the information portals, and, conceivably authoritative sources of scenario data, which provide products and services comparable to TGICA and DDC functions (Annex 2).⁵⁸

B. Themes and goal

38. In consideration of the above mandates and information and experience from previous meetings of the research dialogue, I have identified **two themes** for the ninth meeting of the research dialogue (RD 9):

- (a) **Regional climate research data and information, and gaps;**
- (b) **Science to take stock and assess progress on mitigation.**

39. The goal of the ninth meeting is to provide a **discussion forum** on these two themes for communicating research findings and scientific knowledge, describing capacity building and science communication being undertaken, and identifying needs, in the light of the Convention and Paris Agreement.

40. After the dialogue, I will prepare a summary report, which will be made available on the research dialogue web page before SBSTA 47.

41. I encourage Parties to use all the information referred to in this information note and in RD 9 as a basis for negotiations on research and systematic observation (Agenda item 6(a)) during SBSTA 46.

C. Approach

42. The RD 9 agenda and guiding questions have been drawn up in consideration of the two themes and goal as described in section B above.

43. The meeting will be preceded with a 90-minute poster session, 13.15–14.45. The posters will cover the above-mentioned two themes. Experts will be available with their posters during the session to respond to all queries and provide further information. After the poster session, the same experts will engage in the dialogue 15.00–18.00.

44. The dialogue will start with two keynote presentations. Then, for each of the two themes, an opening presentation will be given, after which experts will present their posters on screen and provide a short accompanying statement (2 minutes) to explain the key messages. After these statements, there will be time for participants to participate in Q&A.

45. Participants at the meeting should come prepared with focussed questions that they would like to ask experts during the Q&A, using the guiding questions below to help provide focus, and be ready to engage actively in the dialogue identifying research needs if necessary.

⁵⁵ <https://esgf.llnl.gov/>.

⁵⁶ <http://ipcc.ch/activities/tgica.shtml>.

⁵⁷ <http://www.ipcc-data.org/index.html>.

⁵⁸ See Annex 5 of <http://ipcc.ch/apps/eventmanager/documents/43/070320170136-INF.%205-ATF-TGICA.pdf>.

Keynote presentations

46. David Carlson, Director of WCRP, will open the dialogue providing an update on climate research including CMIP6,⁵⁹ regional aspects of the grand challenges,⁶⁰ CORDEX,⁶¹ and indicators to support mitigation and adaptation action.

47. The science community is facing increasing challenges to not only provide peer-reviewed answers to the many scientific demands that climate change poses at all levels, but also to communicate its work to decision makers in an ever growing confused discourse on the subject of climate change. Chris Rapley, professor of climate science at University College London, UK, will speak on climate change research and science communication: “Communicating Climate Changed. Why so toxic?”.

Theme 1: Regional climate research data and information, and gaps

48. The opening presentation will be from Andre Kamga Foamouhoue, African Centre for Meteorological Applications for Development (ACMAD) on the role of the WMO regional climate centres.⁶²

49. Experts who have provided posters will then give statements during the dialogue. These experts will include those from the WMO regional centres, Asia–Pacific Network for Global Change Research (APN),⁶³ Caribbean Community Climate Change Centre (CCCCC),⁶⁴ Future Earth,⁶⁵ GCOS, GEO, Inter-American Institute for Global Change Research (IAI),⁶⁶ ISIMIP, the Least Developed Countries Expert Group (LEG),⁶⁷ the Royal Netherlands Meteorological Institute (KNMI),⁶⁸ Secretariat of the Pacific Regional Environment Programme (SPREP),⁶⁹ and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER).⁷⁰

50. The guiding questions for theme 1 include:

- (a) **What is the regional coverage of observational climate data for research, and what are the gaps?**
- (b) **What scientific information is available to support mitigation, and adaptation and NAPs?**
- (c) **What scientific information on downscaling is available for provision of regional and national scale climate scenarios?**
- (d) **What activities are in place to provide and strengthen regional and national climate services, and what are the gaps?**

Theme 2: Science to take stock and assess progress on mitigation

51. The opening presentation will be from Jim Skea, Co-chair of Working Group III of IPCC who will provide an update on scientific aspects relating to taking stock and assessing progress on mitigation.

52. Experts who have provided posters will then give statements during the dialogue. These experts will include those from the CD-LINKS Project,⁷¹ the CGIAR consortium,⁷² Environmental Change Institute;⁷³ Global Carbon Project,⁷⁴ IIASA, and the Institute for Sustainable Development and International Relations (IDDRI).⁷⁵

⁵⁹ <http://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6>.

⁶⁰ <http://www.wcrp-climate.org/grand-challenges>.

⁶¹ <http://www.cordex.org>.

⁶² <http://www.wmo.int/pages/prog/wcp/wcasp/rcc/rcc.php>.

⁶³ <http://www.apn-gcr.org>.

⁶⁴ <http://www.cariwig.org/en>.

⁶⁵ <http://www.futureearth.org>.

⁶⁶ <http://www.iai.int>.

⁶⁷ <http://unfccc.int/4727>.

⁶⁸ <http://www.knmi.nl>.

⁶⁹ <http://www.sprep.org>.

⁷⁰ <http://www.un-spider.org>.

⁷¹ <http://www.cd-links.org>.

⁷² <http://www.cgiar.org>.

⁷³ <http://www.eci.ox.ac.uk>.

⁷⁴ <http://www.globalcarbonproject.org>.

⁷⁵ <http://www.iddri.org>.

53. The guiding questions for theme 2 include:
- (a) **How can we take stock and assess progress on the Paris Agreement long-term mitigation goal (Article 4.1), including by using indicators?**
 - (b) **How can science information support the facilitative dialogue 2018?**
 - (c) **What are the emerging information, opportunities and cost estimates in addressing climate change in line with sustainable development?**
 - (d) **How do we consider the role of other short-lived climate forcers in reducing temperature?**

D. Date and venue

54. The ninth meeting of the research dialogue will take place on 10 May 2017, during SBSTA 46. The poster session will be at 13.15–14.45 in front of room Wien 1–2. This will be followed by presentations and dialogue at 15:00–18:00, Room Genf, World Conference Centre, Bonn, Germany.
55. The posters will be available at the conference venue following the meeting until 13 May.
56. The agenda, posters and presentations will be available online from the dedicated RD 9 website.⁷⁶

⁷⁶ <http://www.unfccc.int/10154>.

Annex I

Analysis of themes and presentations from all meetings of the research dialogue

57. The foundation for the research dialogue was given in decision 9/CP.11⁷⁷ and the focus identified at SBSTA 26, at which SBSTA invited relevant research programmes and organizations to regularly inform the SBSTA of developments in research activities relevant to the needs of the Convention.⁷⁸ In 2011, recommendations from SBSTA 35 to the COP, resulted in decision 16/CP.17.⁷⁹

58. **Table 1** identifies the main themes covered in all previous meetings of the research dialogue along with the presentations and poster titles and expert presenter. The focus of presentations and posters is also categorized to show which ones addressed the following aspects of activities identified in the mandates referred to above:

- (a) **Discussing needs** for climate change research and research-related capacity-building, particularly the needs of developing countries to support the work of the Convention;
- (b) **Conveying research findings, emerging information and lessons learned** from activities undertaken by regional and international research programmes and organizations of relevance to the Convention;
- (c) Informing on **capacity-building, communications and networking**.

⁷⁷ FCCC/CP/2005/5/Add.1, pages 19–20.

⁷⁸ FCCC/SBSTA/2007/4, paragraph 47.

⁷⁹ FCCC/CP/2011/9/Add.2, page 47.

Table 1
 Analysis of presentations from research dialogues to date (RD 1–8)

SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³	
30	1	Conveying emerging research findings and activities and research-related capacity building activities	Emerging scientific findings	Emerging Scientific Findings and Activities Relevant to UNFCCC	Rik Leemans	ESSP		√		
				Climate Change: global risks, challenges and decisions	Katherine Richardson	IARU		√		
				IPCC: Towards AR5	Jean-Pascal Van Ypersele	IPCC		√		
			Research-related capacity-building activities and activities in the regions	START's input to the SBSTA 30 Research Dialogue	Jon Padgham	START			√	
				Climate change research and observations in the FP7: Results, planning, activities, research needs	Elisabeth Lipiatou	FP7		√		
				IPCC-WG2 - Future Research Needs	Holm Tiessen	IAI	√			
	Developments in Climate Change	Andrew Matthews	APN				√			
30	1	Total					1	4	2	
32	2	Conveying emerging research findings and activities, research-related capacity-building activities and research needs and priorities	Emerging scientific findings	What is dangerous climate change?	Rik Leemans	ESSP		√		
				Climate information for decision making	Ghassem R. Asrar	WCRP		√		
				Ocean acidification	Sybil Seitzinger	IGBP		√		
				IPCC AR5: Innovations and cooperation among WGs	Ottmar Edenhofer	IPCC		√		
			Research-related capacity-building activities and activities in the regions	Asia-Pacific Network for Global Change Research	Andrew Matthews	APN			√	
				Climate change research in the 7th Framework Programme: Results and new initiatives	Elisabeth Lipiatou	FP7		√		√
				Science-policy dialogues on climate change	Jon Padgham	START	√			√
			Overview presentations by Parties and panel discussion on climate change research needs and priorities in support of the Convention	Research needs and priorities to support UNFCCC	Ann Gordon	Belize	√			
				Science and an effective response to climate change	David Warrilow	European Union	√			√
				Challenges and needs in research	Hiroki Kondo	Japan	√			
	Needs for research and systematic observation in Africa	Birama Diarra	Mali	√						
	Perspectives from the United States	Benjamin Zaitchik	United States of America	√			√			
32	2	Total					6	5	5	
34	3	Conveying emerging research findings and activities, research-related capacity-building activities including	Overview of recent key findings from regional and international climate change research	Summary of main scientific findings presented at the SBSTA workshop on research	Sergio Castellari	Italy	√			
				Emerging results from global climate change research	Guy Midgley	ESSP		√		
				Findings from UNEP/WMO Integrated Assessment of Black Carbon and Tropospheric Ozone	Drew Shindell	UNEP		√		
				Arctic Council Assessment of Regional and Global Climate Change Impacts on Snow, Water, Ice and Permafrost in the Arctic	Morten Skovgård Olsen	AMAP	√	√		

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³		
		developments towards AR5, and research needs and priorities and communication activities	Developments towards preparation of the AR5	IPCC, Article 2, Sea-level rise and Scenario Development	Jean-Pascal van Ypersele	IPCC		√			
					New features in IPCC AR5	Renate Christ	IPCC	√	√		
					Research needs and priorities to support emerging issues under the UNFCCC: views by Parties	Needs for research and systematic observation	Birama Diarra	Mali on behalf of LDCs	√		
						AOSIS concerns and issues for consideration	Clifford Mahlung	Jamaica on behalf of AOSIS	√		
						Overview of Research Needs to address Climate Change: The case for Botswana	David Lesolle	Botswana	√		√
						Blue Carbon: Consideration in SBSTA	Federica Bietta	Papua New Guinea	√		
				Good practices and challenges in communicating climate change research results	Policy-making relevant questions to the socio-economic scientific community	José Romero	Switzerland	√		√	
					Developments on the Global Framework for Climate Services: Communicating climate information	Mannava Sivakumar	WMO	√	√	√	
					Communicating climate science to policy makers: A success story from the IAI collaborative research in the Americas	Ione Anderson	IAI			√	
				Collaboration with and opportunities for building research capacity in developing countries	Communicating scientific knowledge and needs for research on vulnerability, impacts and adaptation	Cynthia Rosenzweig	PROVIA	√		√	
					Enhanced research capacity building in developing countries in the Asia-Pacific: Success stories	Andrew Matthews	APN			√	
				Needs and priorities for enhanced research capacity and for enhanced science-policy dialogue: views by Parties	Capacity building for adaptation research: START's African Climate Change Adaptation Fellowship Programme	Jon Padgham	START			√	
					Enhanced science-policy dialogue and communication	Katrine Krogh Andersen	Denmark			√	
34	3		Total					10	6	8	
36	4	Conveying emerging research findings and activities including on: emission pathways, new scenarios and recent global and regional emission	Research findings: updates from recent climate change research on aspects relevant to the long-term global goal – emission pathways, new scenarios and recent global and regional emission trends	Low stabilization and new long term scenarios from the IPCC special report on renewables (SRREN)	Jan Minx	TSU Head of WGIII of the IPCC		√			
				State of the community driven scenario process: New framework for future scenario development for the AR5	Tom Kram	IPCC		√			
				Results from research by the Earth System Science Partnership (ESSP) programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS) of relevance to the long term global goal	Rik Leemans	ESSP		√			

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³		
		trends; coastal and marine ecosystems: greenhouse gas sources, sinks and reservoirs; and capacity building	Research findings: Coastal and marine ecosystems: Greenhouse gas sources, sinks and reservoirs	Some results from the WCRP on climate modelling	Adrian Simmons	WCRP		√			
				Impacts and costs of climate change under different scenarios: results from selected FP7 projects (ClimateCost, IMPACT2C, etc.)	Luca Perez	FP7		√			
				Technical and scientific aspects of sources, sinks and reservoirs of all GHGs for coastal and marine ecosystems (mangroves, tidal salt marshes, wetlands and sea grass meadows)	Boone Kauffman	Coalition for Rainforest Nations	√	√			
				Development of marine sciences in South America: Ocean, climate and fisheries - the Patagonia Shelf case	Alberto Piola	IAI		√			
				Results from research by the ESSP and its partner programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS) on coastal and marine ecosystems - related research	Rik Leemans	ESSP		√			
			Updates from recent climate change research: Other areas of relevance to the Convention, including research-related capacity building	Overview of recent results from research by the ESSP and its partner programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS and START)	Rik Leemans	ESSP		√	√		
				New Climate Change Synthesis Report for policy makers in Asia-Pacific Region and initiatives for capacity development	Andrew Matthews	APN		√	√		
				Observed changes in the climate system. Global sea-level rise and permafrost thawing: results from Ice2Sea and outlook to PAGE21	Luca Perez	FP7		√			
				GHG monitoring from outer space: current outcome and future perspective	Tatsuya Yokota	Japan		√	√		
				Atmospheric measurements for emission estimation: real-world emission verification of halogenated greenhouse gases	Brigitte Buchmann	Switzerland		√	√		
				Needs for research on slow onset events, e.g. sea level rise	Malia Talakai	Nauru, on behalf of AOSIS	√				
				Priorities for vulnerability, impacts and adaptation research	Cynthia Rosenzweig	PROVIA	√		√		
36	4			Total					3	13	5
38	5			Conveying research findings and emerging information including on: IPCC; ecosystems and GHG	Science updates: Recent developments in global climate information	Towards the Fifth Assessment report of the IPCC	Jean-Pascal van Ypersele, Vice Chair	IPCC		√	
		Global science updates from international research programmes and organizations - Including on global carbon budget, regional temperature timelines, sea-level rise, climate predictions, black carbon	Sybil Seitzinger			IGBP and WCRP		√			

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³
		emissions and removals from sources, sinks and reservoirs, including terrestrial ecosystems; and needs for climate change research and developments in research-related capacity-building	Emerging scientific findings: ecosystems and GHG emissions and removals from sources, sinks and reservoirs, including terrestrial ecosystems	Management of different terrestrial ecosystems under a changing climate	Dmitry Zamolodchikov and Andrey Sirin	Russian Federation	√	√	
				Estimation of carbon and their fluxes in tropical peatlands: Results from a Japan-Indonesia joint project	Mitsuru Osaki	Japan		√	
				Overview of findings and results from international research programmes and organizations, including on terrestrial and coastal and marine ecosystems - Including on seagrass habitats and their decline; integration of biodiversity and ecosystems into climate change modelling	Sybil Seitzinger	IGBP, IHDP, DIVERSITAS		√	
				Carbon fluxes in tropical dry forests and savannahs: Human, ecological and biophysical dimensions	Arturo Sanchez-Azofeifa	IAI	√	√	
			Needs for climate change research and developments in research-related capacity-building	Regional capacity development, new opportunities on adaptation	Andrew Matthews	APN	√		√
				Regional capacity development and use of regional climate information - Including on downscaling (CORDEX, Africa), use of climate information for agriculture; START capacity-building workshops and activities	Sybil Seitzinger	IGBP, WCRP and START	√		√
				Research priorities for vulnerability, impacts and adaptation	Cynthia Rosenzweig	PROVIA	√		√
38	5	Total					5	6	3
40	6	Conveying research findings and emerging information including on: global climate information and scientific findings in the polar regions; and needs for climate change research and developments in research-related capacity building	Science updates: recent developments in global climate information	Tropical Dry Forest Resilience and Water Use Efficiency	Arturo Sanchez-Azofeifa,	IAI	√	√	
				Emerging research findings: Extreme events	Sybil Seitzinger/ Vladimir Ryabinin	IGBP / WCRP		√	√
				Report from the Joint GCOS/ Global Observation for Forest Cover and Land Dynamics (GOFC/GOLD) Workshop on 'Observations for Climate Change Mitigation'	Carolin Richter	GCOS	√	√	
				New approaches in climate prediction for better adaptation: near-term prediction and high-resolution ensembles	Masahide Kimoto	Japan	√	√	
			Emerging scientific findings: the polar regions	IPCC WGI findings on the polar regions: warming and polar amplification, permafrost, and sea ice changes	Paul Hezel	IPCC		√	
		IPCC WGII findings on the polar regions: ecosystem impacts of ocean warming and acidification		Hans-Otto Pörtner	IPCC		√		
		Arctic Change: A need for multi-sector collaboration		Jeremy Wilkinson	British Antarctic Survey	√	√	√	

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³	
				Integrated biodiversity and climate scenarios	Sybil Seitzinger	DIVERSITA S		√		
			Needs for climate change research and developments in research-related capacity building	Knowledge gaps identified in AR5	Renate Christ	IPCC	√			
				Caribbean Regional Climate Centre	Carlos Fuller	CCCCC	√		√	
				Climate change research & innovation in the Horizon 2020 programme	Serena Pontoglio	EC, DG Research & Innovation	√		√	
				New capacity building programme for APN	Andrew Matthews	APN	√		√	
40	6	Total					8	8	5	
42	7	Addressing data and information gaps, including from the IPCC	(a) What is the role of the ocean in the climate system and climate change? This includes timely science on oceanic climate change, climate change impacts on the ocean, ocean ecosystems and human food chains.	Efforts undertaken to address the information gaps in AR5	Thomas Stocker	IPCC	√	√		
				Confronting Urgent Climate Challenges	David Carlson	WCRP and on behalf of Future Earth partners	√	√		
			(b) What are the links between climate change and desertification? (c) What experience has been gained from global and regional initiatives to support regional assessment of climate change, its risks and impacts, including to support effective adaptation responses?	Linkages between Climate Change and Land Degradation	Sergio Zelaya	UNCCD	√	√		
				Human influence on extreme events: new approach by Probabilistic Event Attribution	Masato Mori	Japan		√		
				Downscaling of CMIP6 for regional climate modeling: experiences from CORDEX	Claas Teichmann	EURO-CORDEX		√		
				The KNMI Climate Explorer and International Climate Assessment & Dataset	Gé Verver	KNMI		√		
		Lessons learned and good practices for knowledge and research capacity building, in particular in developing countries	(a) How can access to scientific data and information be improved to enhance research and innovation capacity? (b) How can regional and local capacity be improved to support decision making? (c) What are the opportunities for delivering consistent data and model outputs to support decision making?	Climate knowledge and innovation – research strategies in support of climate policy	Vera Stercken	Germany			√	
				Addressing global societal challenges through EU research funding	Peter Horvath	EC				√
				Some research-related messages from evaluation of the status of the Global Observing System for Climate	Adrian Simmons	GCOS	√		√	
				Capacity Development in Developing States in the Asia-Pacific Region: Some of the Issues	Andrew Matthews	APN	√		√	
				Climate Modelling in the Caribbean	Carlos Fuller	CCCCC	√		√	
42	7	Total:					6	6	5	
44	8	Conveying new scientific findings	(a) Scientific analysis of pathways for achievement of	Update on the Grand Challenges, CMIP6 and CORDEX	David Carlson	WCRP		√		

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³		
		and research information in the light of the Paris Agreement	the “well below 2 °C” global temperature goal and limiting the temperature increase to 1.5 °C, including global and regional transformation pathways and related impacts and top-down, independent verification of carbon sinks and sources	Science Understanding and Gaps on Temperature Change	Panmao Zhai / Valérie Masson-Delmotte	IPCC		√			
				Global Climate Observing System: New findings & Emerging needs	Carolin Richter	GCOS	√	√			
				Observational constraints on the global carbon budget and preliminary analysis of the 2015 anomaly	Philippe Ciais	Global Carbon Project		√	√		
				Differences in climate impacts between 1.5°C and 2°C	Gerald Lindo	AOSIS		√	√		
				Implications from climate - carbon cycle modelling on socioeconomic scenario development	Michio Kawamiya	Japan		√			
				Supporting scientific knowledge and capacity building in the light of the Paris Agreement	(b) The risks and impacts of slow onset events as a result of climate change, particularly including temperature and those that occur in the cryosphere (sea level rise and ocean acidification) and hydrological cycle (drought).	Knowledge and capacity building in developing countries	Maxx Dilley	WMO/GFCS		√	√
						Connecting Science to People	Ione Anderson	IAI		√	√
						Research & Capacity Building: Climate Adaptation and Slow Onset Events	Andrew Matthews	APN		√	√
						Slow onset events: Perspectives from the Pacific	Espen Ronneberg	SPREP	√	√	
						Climate Services: European Research & Innovation	Diogo de Gusmao-Soerensen	EC		√	√
		Translating Climate Science into Useful Products and Services	Marian Westley			NOAA		√	√		
		POSTERS Conveying new scientific findings and research information in the light of the Paris Agreement	POSTERS			The Systematic Observation of Climate from Space	Pascal Lecomte	CEOS		√	
						INDCs and pathways to different temperature targets	Helene Benveniste	France		√	
						GCOS and the UNFCCC: The new Implementation Plan and the Paris Agreement	Simon Eggleston	GCOS		√	√
						The GEO Carbon and GHG Initiative as a contribution to UNFCCC	Antonio Bombelli	GEO		√	
				Pathways for achieving the Paris Agreement’s Article 2 and 4 goals	Joeri Rogelj	IIASA		√			
				The Shared Socioeconomic Pathways: An Overview	Joeri Rogelj	IIASA		√			
				Using atmospheric observations to assess fossil fuel CO2 emissions in California	Heather Graven	Imperial College London		√			
				Sea level in a changing climate: AR5 and recent scientific advances	Valérie Masson-Delmotte	IPCC WG I		√			
				Drought in a changing climate: AR5 and recent scientific advances	Valérie Masson-Delmotte	IPCC WG I		√			
				Probabilistic information on climate change in extreme events by high-resolution large ensemble simulations	Ryo Mizuta	Japan		√			

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³	
				Probabilistic impacts assessment of low emission pathways	Katja Frieler	PIK		√		
				New Shared Socioeconomic Pathways in WCRP's Coupled Model Intercomparison Project	David Carlson	WCRP		√		
				Recent Surprises in Our Climate System	David Carlson	WCRP		√	√	
				Progress on the Integrated Global Greenhouse Gas Information System (IG3IS)	Deon Terblanche	WMO		√	√	
		Supporting scientific knowledge and capacity building in the light of the Paris Agreement		Reducing emissions from agriculture to meet ambitious limits on global temperature increase	Meryl Richards	CGIAR	√	√		
				European Commission Climate Services	Diogo de Gusmao-Soerensen	EC		√		
				Work towards slow onset events	Monika Antosik,	L&D ExCom	√			
				Work towards catalyzing further action	Dawn Pierre-Nathaniel and Idy Niang	L&D ExCom	√			
				Contrasting futures for ocean and society from slow-onset climate-related changes	Alexandre Magnan	France		√		
				Combining local and scientific knowledge to increase adaptive capacity to global changes among farmers in Mesoamerica	Edwin Castellanos	IAI / Guatemala		√		
				Translating climate research into useful products and services	Marian Westley	NOAA		√	√	
				Wetlands help reduce drought	Edmund Jennings	RAMSAR	√	√	√	
				Reducing risk and impacts of climate-related disasters: Making space-based observations usable in developing countries - The agricultural drought example	Joachim Post	UN-SPIDER		√	√	
				How does Climate Change Affect Migration in the Pacific	Robert Oakes	UNU-EHS		√		
				YESS - Young Researchers Address the Future of Earth System Science	David Carlson	WCRP			√	
				The Global Framework for Climate Services (GFCS)	Maxx Dille	WMO/GFCS			√	
44	8		Total:					6	33	15
46	9			1. Regional climate research data and information, and gaps.						
			2. Science to take stock and assess progress on mitigation.							
Themes suggested for future dialogues		Possibilities, challenges and role of cities and regions in climate mitigation and adaptation efforts, including climate proofing urban and regional development.								
		Economic aspects of addressing climate change (cost estimates of climate change impacts, mitigation and adaptation, and related costing uncertainties).								

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SBSTA	RD	Description	Themes	Title	Presenter	Organization	Needs ¹	Convey updates ²	Communi cation ³
		The role of the ocean in the climate system and climate change, such as: ocean heat content change and its significance for climate change trends; factors contributing to sea level rise, including marine ice sheet instability and regional sea level rise; ocean acidification and other drivers of impacts on marine ecosystems.							
		Low emissions climate-resilient development: the human dimension (including social, behavioral, and cultural information).							
		Research of greenhouse gas flows through natural terrestrial systems (forests, swamps, water bodies, etc.) to assess their climate-regulating potential, including the aspects of their protection, optimal use and measures to recover the degraded ecosystems.							

Annex II

Information portals, and, conceivably authoritative sources of scenario data, which provide products and services comparable to TGICA and DDC functions.¹

#	Title	URL	Hosting region	Meta site	Comments
1	CMIP5 home page	http://cmip-pcmdi.llnl.gov/cmip5/	2,4,5,6 (WCRP)	No	Description of CMIP5 experimental design and links to model output archive.
2	CMIP6 home page	https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6	2,4,5,6 (WCRP)	No	Description of CMIP6 experimental design and links to related datasets
3	ESGF projects page	https://pcmdi.llnl.gov/projects/esgf-llnl/	4 (Lawrence Livermore National Laboratory)	Yes and No	Provides access to CMIP3 and CMIP5 model output archive, and will be home to CMIP6 archive once available
4	ENES (European Network for Earth System modelling)	https://verc.enes.org	6 (European network)	Yes	Is closely related to ESGF
5	Obs4MIPS	https://www.earthsystemcog.org/projects/obs4mips/	4 (Univ. Colorado)	Yes	Provides access to a growing archive of observational data, in the same format as CMIP model output, to facilitate model evaluation.
6	Shared Socioeconomic pathways (SSPs)	https://tntcat.iiasa.ac.at/SSpDb/dsd?Action=htmlpage&page=about	6 (IIASA)	No	Provides access to greenhouse gas, aerosols, land-use and other forcings used as input to CMIP6 models.
7	NOAA ocean observations	http://www.ospo.noaa.gov/Products/ocean/sst.html	4 (NOAA)	No	A range of sea-surface temperature products
8	Surface temperature observations	http://www.esrl.noaa.gov/psd/data/gridded/tables/temperature.html	4 (NOAA)	No	A large collection of different surface temperature data sets
9	National Snow and Ice Data Centre	https://nsidc.org/	4 (Univ. Colorado)	No	Home page for a large archive of cryosphere data (snow, sea-ice, glaciers, ice sheets, permafrost)
10	UK Met Office obs	http://www.metoffice.gov.uk/hadobs/hadisst/	6 (Met Office Hadley Centre)	No	Near surface air temperature, sea-surface temperature, and sea-ice concentration data set compiled by Hadley Centre
11	CCDS	http://ccds-dscc.ec.gc.ca	4 (Canada)	No	Canadian Climate Data and Scenarios site, providing historical climate data for Canada, along with CMIP3 and CMIP5-derived future climate scenarios
12	KNMI climate explorer	https://climexp.knmi.nl/start.cgi?id=someone@somewhere	6 (Netherlands)	No	Netherlands site hosting a range of observation and model-based climate information, along with user-oriented tools for analysis
13	UKCIP	http://www.ukcip.org.uk/	6 (UK, Univ. Oxford)	No	UK-based site providing climate data and tools to support adaptation planning
14	Country Level Impacts of Climate Change (CLICC)	http://www.unep.org/provia/CLICCPROJECT/tabid/1060147/Default.aspx	1 (UNEP)	Yes and No	UNEP Provia site for country-level impact studies
15	Provia Guidance document	http://www.unep.org/provia/RESOURCES/Publications/PROVIAGuidancereport/tabid/130752/Default.aspx	1 (UNEP)	Yes	Guidance document on assessing vulnerability, impacts and adaptation to climate change.

Hosting regions are: 1-Africa; 2-Asia-Pacific; 3-South America; 4-North America, Central America and the Caribbean; 5-South-West Pacific; and 6-Europe.

¹ Taken from Annex 5 of <http://ipcc.ch/apps/eventmanager/documents/43/070320170136-INF.%205-ATF-TGICA.pdf>.