

## Information on the tenth meeting of the research dialogue

### Note by the Chair of the SBSTA

11 April 2018

## I. Introduction

1. As requested by the Subsidiary Body for Scientific and Technological Advice (SBSTA) at its twenty sixth session,<sup>1</sup> building on the Conference of the Parties (COP) **Decision 9/CP.11**,<sup>2</sup> the secretariat will organize annual meetings of the research dialogue, inviting research programmes and organizations to inform the SBSTA of developments in research activities to support the needs of the Convention. **Decision 16/CP.17**<sup>3</sup> urged Parties and invited relevant organizations to use the dialogue as a forum for conveying research findings and lessons learned and discussing needs for climate change research and research-related capacity-building, particularly those of developing countries.<sup>4</sup>

2. At its forty-sixth session, the SBSTA invited Parties to submit their views on possible topics and considerations for the research dialogue to be held in conjunction with SBSTA 48 and beyond.<sup>5</sup>

3. Submissions were received from: the Arab Republic of Egypt on behalf of the African Group of Negotiators; Argentina, Brazil and Uruguay; Bulgaria and the European Commission on behalf of the European Union; Ethiopia on behalf of the LDC Group; Japan; Saint Lucia on behalf of CARICOM.<sup>6</sup>

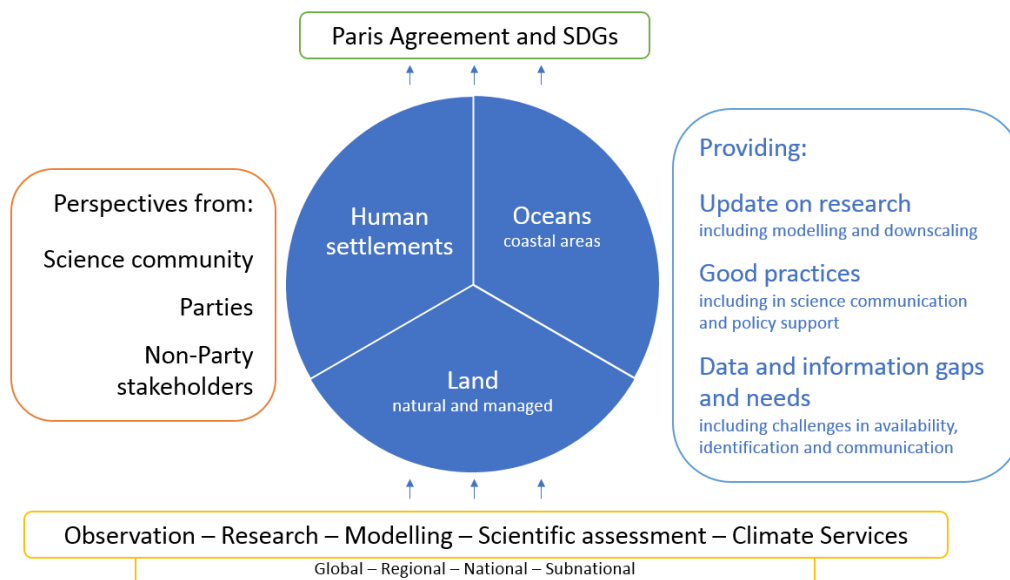
4. Also at SBSTA 46,<sup>7</sup> the SBSTA invited its Chair to provide a summary report of the ninth meeting of the research dialogue (RD 9), held on 10 May 2017. The RD 9 summary report is available online.<sup>8</sup>

## II. Goal and themes

5. The tenth meeting of the research dialogue (RD 10) has been developed with the goal to provide discussion at the science – policy interface in support of action under the Paris Agreement (figure 1).

**Figure 1**

Tenth meeting of the research dialogue: supporting action under the Paris Agreement based on the best available science



<sup>1</sup> FCCC/SBSTA/2007/4, paragraph 47.

<sup>2</sup> FCCC/CP/2005/5/Add.1, pages 19–20.

<sup>3</sup> FCCC/CP/2011/9/Add.2.

<sup>4</sup> See <https://cop23.unfccc.int/topics/science/workstreams/research/research-dialogue>.

<sup>5</sup> FCCC/SBSTA/2017/4, paragraph 19.

<sup>6</sup> See <http://www4.unfccc.int/sites/submissionportal/Pages/Home.aspx>.

<sup>7</sup> FCCC/SBSTA/2017/4, paragraph 48.

<sup>8</sup> See <https://cop23.unfccc.int/event/rd-9>.

6. In consideration of this goal, the above mandates and submissions, as well as information from previous meetings (see Annex), relevant activities under the Convention (see section V) and by international programmes and organizations (see section VI) as well as the wider scientific community, I have identified the themes and guiding questions for RD 10 (see table 1).

**Table 1**

Themes and guiding questions for the tenth meeting of the research dialogue

<b>Theme 1. Science for understanding - update on research and modelling on human settlements, oceans and land and their importance for the implementation of the Paris Agreement</b>	
Focus	<ul style="list-style-type: none"> <li>• Human settlements</li> <li>• Oceans – coastal marine ecosystems</li> <li>• Land – natural and managed ecosystems</li> </ul>
Guiding questions	<ul style="list-style-type: none"> <li>• What are the key outputs from the global research and modelling community to support action to meet the Paris Agreement goals at global, regional and national level?</li> <li>• How can research inform and improve the management of ecosystems for adaptation?</li> <li>• What is the role of ecosystems in the carbon cycle, what are the main uncertainties and how can these be addressed?</li> <li>• What research is being undertaken and what is needed to improve understanding of ecosystems, climate change and human–ecosystem relationships?</li> <li>• How can research and modelling inform and assess progress on the management of urban, land and coastal ecosystems? What are the known aspects of ecosystem protection, optimal use and measures to recover degraded ecosystems?</li> </ul>
<b>Theme 2. Science for action - strengthening the link between the research community and action to meet the goals of the Paris Agreement</b>	
Focus	<ul style="list-style-type: none"> <li>• Good practices on communicating science</li> <li>• Identifying, communicating and closing data and information gaps</li> </ul>
Guiding questions	<ul style="list-style-type: none"> <li>• What are the best practices for science communication to support understanding of climate change impacts, vulnerabilities and options for decision making on adaptation, mitigation and loss and damage?</li> <li>• What can be done to strengthen the understanding of: climate change impacts at 1.5°C and higher levels of warming; adaptation and mitigation options and their costs; and associated co-benefits for society, particularly in developing countries?</li> <li>• What can be done and where are the synergies to improve access to data and information so as to close knowledge gaps at regional and national level to scale up action?</li> <li>• How can the research community optimise its support for the global stocktake?</li> </ul>
<b>Theme 3. Renewable energy economics and co-benefits</b>	
Focus	<ul style="list-style-type: none"> <li>• The feasible scale of mitigation in the energy sector and the co-benefits for society and the environment, particularly in regards to developing countries</li> </ul>
Guiding question	<ul style="list-style-type: none"> <li>• What is the current understanding on the feasible scale of mitigation and what are the research gaps to improve understanding in support of decision making on options and co-benefits in developing countries?</li> </ul>
<b>Theme 4. Global research on the carbon cycle, and its observation requirements, in support of the Paris Agreement</b>	
Focus	<ul style="list-style-type: none"> <li>• Ongoing developments towards a real-time verification of carbon dioxide emissions and requirements from the observation community</li> </ul>
Guiding question	<ul style="list-style-type: none"> <li>• How are the scientific community supporting a better understanding of the carbon cycle to provide policy-relevant data and information, as well as support the global stocktake?</li> </ul>

7. A wide range of themes were suggested in submissions. The Annex provides a summary of themes and presentations from all previous meetings of the research dialogue as well as themes suggested by Parties that it has not yet been possible to cover and which could be addressed by future dialogues.

### III. Approach

8. The research dialogue will consist of a two hour poster session followed by a three hour dialogue.

9. The posters will cover all four above-mentioned themes. Experts will be available with their posters during the poster session to respond to all queries and provide further information.

10. After the poster session, the dialogue will start with two keynote presentations from WCRP on updates on global research and modelling and from the IPCC on outcomes from the cities and climate change science conference. The presentations will be followed by panel discussions, one on theme 1 and one on theme 2, with experts providing short briefs on relevant topics in response to the themes and guiding questions and then engaging in Q&A with participants.

11. Participants at the meeting should come prepared with focused questions that they would like to ask experts during the Q&A, using the guiding questions in table 1 to help provide focus, and be ready to engage actively in the dialogue identifying research needs if necessary.

12. After the dialogue, I will prepare a summary report, which will be made available on the research dialogue webpage before SBSTA 49.

13. I encourage Parties to use all the information referred to in this information note and in RD 10 to inform the negotiations on research and systematic observation (Agenda item 6) during SBSTA 48.

### IV. Date and venue

14. The tenth meeting of the research dialogue will take place on 3 May 2017, during SBSTA 48. The poster session will be at 14:00–16:00 in the foyer of the World Conference Centre (WCCB), Bonn, Germany. This will be followed by presentations and dialogue at 16:00–19:00, Room tbc, WCCB.

15. The posters will be available at the conference venue following the dialogue for the remainder of the SBSTA 48 session.

16. The RD 10 agenda has been drawn up in consideration of the goal, themes and guiding questions. The agenda, posters and presentations will be made available online from the dedicated RD 10 website.<sup>9</sup>

### V. Relevant activities under the UNFCCC

17. This section provides further information on some of the activities under the UNFCCC relevant to RD 10.

18. The Paris Agreement requires all Parties to strengthen the global response to the threat of climate change based on the best available scientific knowledge. In its pre-ambular, the **Paris Agreement notes the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity**. It emphasises the urgency in which action should be taken.<sup>10</sup>

19. Under the Nairobi work programme, the action pledge on the **Lima Adaptation Knowledge Initiative (LAKI)**<sup>11</sup> led by UN Environment in collaboration with the secretariat, aims to close knowledge gaps impeding climate change adaptation action in various subregions. To date, five priority-setting workshops have been held in: the Andean subregion, the Gulf Cooperation Council subregion, the Southern Africa subregion, the Hindu Kush Himalayan subregion and the Indian Ocean island countries subregion. At COP23, November 9th, the UNFCCC secretariat and UN Environment co-convoked a COP 23 side event to share the outcomes of the first phase of the LAKI and discuss the next phase of the LAKI's knowledge-for-action implementation.<sup>12</sup>

20. SBSTA 47 recognised the significant efforts made under the first phase of the LAKI, and expressed support for enhanced communication during the second phase of the LAKI. The SBSTA requested the secretariat, under

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<sup>9</sup> See <https://unfccc.int/event/tenth-meeting-of-the-research-dialogue-rd-10>.

<sup>10</sup> See <https://unfccc.int/process/the-paris-agreement/the-paris-agreement>.

<sup>11</sup> See <http://www4.unfccc.int/sites/NWP/News/Pages/LAKI-methodology.aspx>.

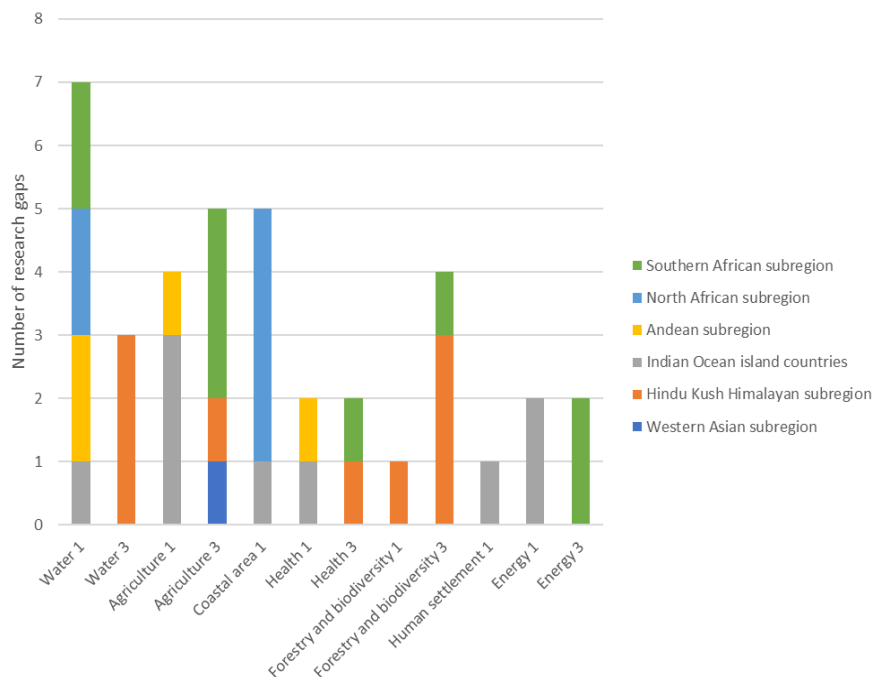
<sup>12</sup> See <http://www4.unfccc.int/sites/NWP/News/Pages/Bridging-knowledge-to-climate-adaptation-action-gaps.aspx>.

the guidance of the Chair of the SBSTA, to explore opportunities to strengthen the partnerships, inter alia, with scientific organizations and academia. This can be facilitated via the research dialogue.

21. Over a third of priority gaps identified at the LAKI workshops to date are under the thematic area of scientific research and climate observation (figure 2). A poster on the gaps identified will be presented under theme two.

22. The Nairobi work programme report submitted to SBSTA 48 on Adaptation in human settlements provides a summary of information from submissions on key findings, good practices and lessons learned on adaptation in human settlements and is based on submissions from Parties and organizations and expert knowledge of the **latest experience and research**.<sup>13</sup>

**Figure 2.**  
 Lima Adaptation Knowledge Initiative - Priority research gaps by subregion



The graph shows the thirty eight out of eighty five climate adaptation knowledge gaps identified under the Lima Adaptation Knowledge Initiative (LAKI) that are associated with research gaps. The LAKI knowledge gaps are categorized into five clusters, and the research gaps represent cluster 1 and 3. These clusters of knowledge gaps exist because of lack of data or lack of actionable knowledge (such as in need of repackaging existing knowledge into usable formats).

23. The **technical examination process** was established at COP 21 as part of the enhanced action prior to 2020 in the decision adopting the Paris Agreement.<sup>14</sup> As mandated by Decision 1/CP.21, a series of technical expert meetings (TEMs) for adaptation (TEM-A) and mitigation (TEM-M) involving Parties and non-Party stakeholders are ongoing.

24. The technical paper on *Opportunities and options for integrating climate change adaptation with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction 2015–2030*,<sup>15</sup> based on the technical papers from the TEM-As that took place in May 2017 in conjunction with SB 46, identifies opportunities for enhancing adaptation action, as well as options for supporting the implementation of specific actions, including by integrating adaptation with efforts to achieve the SDGs and implement the Sendai Framework for Disaster Risk Reduction 2015–2030.

25. One of the common themes identified in the paper was that both **resilience and ecosystems** are core concepts in all three agendas and can encourage integrated planning approaches. To support implementation of these approaches, **research is needed to improve understanding of ecosystems, climate change and human–ecosystem relationships**. This has been highlighted as a question under theme one.

26. Also identified from the TEM-As was the need for higher-resolution information about the impacts of climate change and the risks that climate change poses to societies. A key message was that **the availability of**

<sup>13</sup> FCCC/SBSTA/2018/3.  
<sup>14</sup> Decision 1/CP.21, paragraph 124.  
<sup>15</sup> See <https://unfccc.int/documents/28826>.

**data, including climate and socioeconomic data, and their resolution, remain a challenge, especially in Africa,** and will be considered under theme two.

27. The importance of research was also highlighted in discussions during the TEM-Ms,<sup>16</sup> particularly in the need to **prioritize investment on agricultural research** for mitigation and adaptation action in the land use sector, and, for **urban areas**, for national and local government authorities to create **enabling environments** for collaborators, private companies and researchers to come up with innovative solutions for sustainable urban systems.

28. In regards to the work on **national adaptation plans**, the Least Developed Countries Expert Group (LEG) organized the NAP Expo 2018 *Advancing National Adaptation Plans*, on 4–6 April 2018 in Sharm El Sheikh, Egypt. A session on “**Climate data and scenarios and open NAPs**” was led by the **World Meteorological Organization and the Climate Service Centre Germany (GERICS)**.<sup>17</sup> A poster on the outcomes of this session will be presented under theme two.

29. The Executive Committee of the **Warsaw International Mechanism for Loss and Damage (L&D ExCom)**, as part of their five year workplan, are building **closer cooperation with the scientific community, including the IPCC**, particularly in regards to Action Area 6 and Action Area 7, the latter under the activity: encourage, promote and coordinate with research and development processes on financial instruments and tools that address the risks of loss and damage associated with the adverse effects of climate change.<sup>18</sup>

30. The work of the L&D ExCom towards slow onset events and catalyzing action was highlighted at RD 8.<sup>19</sup> Since that time, the L&D ExCom have developed a database of organizations working on slow onset events and the scope of their current efforts.<sup>20</sup> A poster analysing the organizations by region and function area was displayed at seventh meeting of the L&D ExCom, 13–16 March 2018, Bonn, Germany.<sup>21</sup>

31. The **Climate Technology Centre and Network (CTCN)**<sup>22</sup> promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries. A number of network partners are carrying out research and research-related capacity building on renewable energies, energy efficiency and planning, to exchange information at the science-policy interface.<sup>23</sup>

32. The COP23 Fijian Presidency Oceans Initiative, the **Oceans Pathway Partnership** was launched at COP23,<sup>24</sup> affirming the call for action from the UN Ocean conference. The latter was recognised by the SBSTA, as well as the importance of ocean indicators in informing on the state of the global climate.<sup>25</sup>

33. **The Talanoa dialogue**, being conducted by the Fijian and Polish presidencies in accordance with the design set out in the annex to Decision 1/CP.23, considers inputs on three general topics: Where are we? Where do we want to go? How do we get there?<sup>26</sup> A dedicated space will be provided in the dialogue, both during the preparatory and the political phase to facilitate the understanding of the implications of the Special Report by the IPCC on global warming of 1.5°C. A number of submission have been provided on the three topics. A WMO submission on the statement on the state of the global climate in 2017 responds to the first question.

34. SBSTA 46 noted the importance of the work of the scientific community and the IPCC in support of strengthening the global response to climate change, including *inter alia* considering the human dimension, and indigenous peoples’ and traditional knowledge.<sup>27</sup> At SBSTA 47, the **local communities and indigenous peoples platform (LCIPP)** was operationalised.<sup>28</sup> One of the agreed functions of the LCIPP is related to knowledge: to promote the exchange of experience and best practices, as well as technologies, practices and efforts of local communities and indigenous peoples related to addressing and responding to climate change.<sup>29</sup> The further operationalisation of the platform is being considered at SBSTA 48.

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<sup>16</sup> See [https://unfccc.int/files/focus/mitigation/technical\\_expert\\_meetings/application/pdf/tems-mitigation-report-2017.pdf](https://unfccc.int/files/focus/mitigation/technical_expert_meetings/application/pdf/tems-mitigation-report-2017.pdf).

<sup>17</sup> See <http://napexpo.org/2018/>.

<sup>18</sup> See <https://unfccc.int/documents/61005>.

<sup>19</sup> See <https://unfccc.int/event/eighth-meeting-research-dialogue-rd-8-sbsta-44>.

<sup>20</sup> See <http://www4.unfccc.int/sites/NWP/Pages/soesearch.aspx>.

<sup>21</sup> See [https://unfccc.int/files/adaptation/application/pdf/poster\\_for\\_the\\_soe\\_-\\_feb\\_2018.pdf](https://unfccc.int/files/adaptation/application/pdf/poster_for_the_soe_-_feb_2018.pdf).

<sup>22</sup> See <http://www.ctc-n.org/>.

<sup>23</sup> See <https://www.ctc-n.org/about-ctcn/knowledge-partners>.

<sup>24</sup> See <https://cop23.com.fj/the-ocean-pathway/>.

<sup>25</sup> FCCC/SBSTA/2017/7, paragraph 54.

<sup>26</sup> See <https://unfccc.int/process/the-paris-agreement/2018-talanoa-dialogue-platform>.

<sup>27</sup> FCCC/SBSTA/2017/4.

<sup>28</sup> Decision 2/CP.23.

<sup>29</sup> Decision 2/CP.23, paragraph 6(a).

## VI. Update on research activities by international programmes and organizations

35. This section provides an update on research activities from international scientific organizations and agencies relevant to RD 10 that will be presented through posters and/or discussions during the dialogue, as part of a range of wider inputs.

### World Climate Research Programme

36. The World Climate Research Programme (WCRP) is developing a **new Strategic Plan** (for 2019–2029), under the guidance of its Joint Scientific Committee and taking account the recent Programme review commissioned by its sponsors WMO, UNESCO-IOC and the International Council for Science (ICSU). The Strategic Plan will be finalized by the end of 2018 and will be complemented by a five year Implementation Plan, detailing how the strategic plan will be achieved, with a second instalment of the implementation plan to be produced in 2024.<sup>30</sup>

### *Coupled Model Intercomparison Project*

37. The **Coupled Model Intercomparison Project Phase 6** (CMIP6)<sup>31</sup> is now well underway and will contribute significantly to the IPCC 6th Assessment Report. CMIP6 includes 21 endorsed model intercomparison projects that address key science questions on the response to radiative forcings, variability, predictability and future scenarios, and systematic biases in climate projections. More than 70 models from 33 centers are involved in CMIP6. The success of CMIP6 and its timely contribution to the IPCC reports relies critically on the continuous support from Parties to WCRP efforts.

38. Scientists from the Scenario Model Intercomparison Project of CMIP 6 have recently published information describing **low emission scenarios (RCP 1.9)**,<sup>32</sup> as invited by the SBSTA.<sup>33</sup> Mitigation challenges for achieving the low emission scenario differ strongly across the SSPs.

39. The **Inter-Sectoral Impact Model Intercomparison Project** (ISIMIP) offers a consistent framework for cross-sectoral, cross-scale modelling of the impacts of climate change. The key goal of ISIMIP is to contribute to the comprehensive understanding of the impacts of politically and scientifically-relevant climate-change scenarios. The publicly-available ISIMIP archive currently covers impacts on water, biomes, agriculture, fisheries, forests, permafrost, energy, biodiversity and different health indicators. The cross-sectorally consistent framework allows for the aggregation of impacts across sectors to investigate systemic consequences of climate change, including economic damages and effects on human migration patterns.

### *Global Sea Level Budget*

40. The research community's efforts have continued for assessing sea-level rise impacts, as well as for enhancing climate mitigation and adaptation measures over the short-, medium- and long-term.<sup>34</sup> Scientists analysed that, since 1993, when the space-based observations became available to examine the global mean sea level budget<sup>35</sup>, assisted by multi-mission data processes, the **global mean sea level has increased by 3.1 mm per year on average but sea level rise is accelerating over the recent years** (figure 3).<sup>36</sup>

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<sup>30</sup> See <https://www.wcrp-climate.org/wcrp-sp-overview>.

<sup>31</sup> See <https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6>.

<sup>32</sup> See <https://doi.org/10.1038/s41558-018-0091-3> and the RD 9 poster: see [http://unfccc.int/files/adaptation/application/pdf/2.9\\_iiasa\\_rogelj.pdf](http://unfccc.int/files/adaptation/application/pdf/2.9_iiasa_rogelj.pdf).

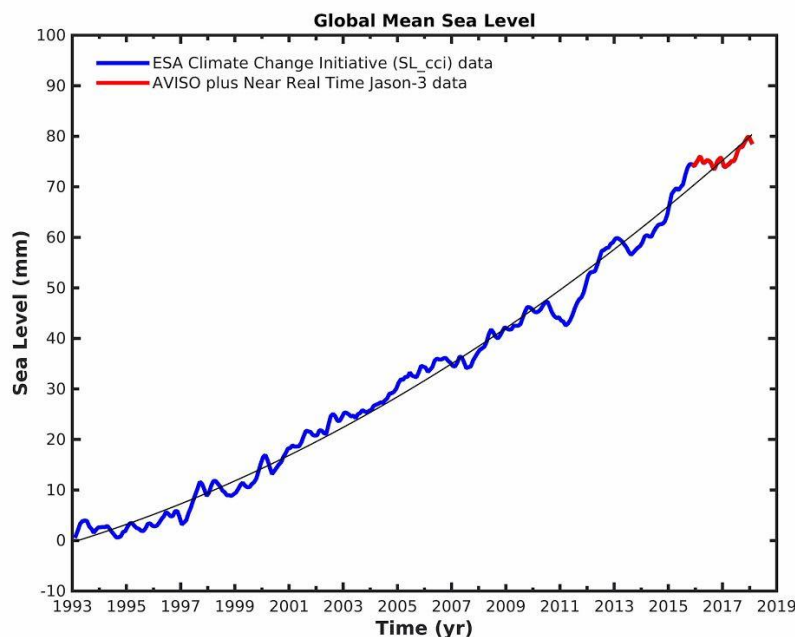
<sup>33</sup> FCCC/SBSTA/2015/2, paragraph 33.

<sup>34</sup> The WCRP GC-sea level (<http://www.wcrp-climate.org/gc-sea-level>) coordinates global research efforts to work more closely with a broad stakeholder community to enhance understanding of sea-level change, and to project its regional mean and extreme states.

<sup>35</sup> The objective of the ESA Sea Level Climate Change Initiative project is to provide stable, long-term satellite-based Sea Level products for climate applications.

<sup>36</sup> Hindumathi Palanisamy, Anny Cazenave, LEGOS.

**Figure 3.**  
Global mean sea level trend from altimetry (1993–2017)\*



\*based on ESA's Climate Change Initiative Project (SL\_cci) from 1993 to 2015, extended (in red) by multi-mission data processed by CNES (AVISO) until end of 2017, and corrected for Topex-A drift

#### *Regional Downscaling*

41. The WCRP Coordinated Regional Downscaling Experiment (CORDEX) seeks to advance and coordinate the science and application of regional climate downscaling through global partnerships. One goal of this effort is to provide useful climate information to climate services who apply the information to user needs. In this context, the new **CORDEX-CORE** (Coordinated Output for Regional Evaluation) **framework** aims at delivering a consistent high-resolution climate data-set for all major land-masses of the world to be used in climate change and climate impact studies. It produces a baseline set of homogeneous high-resolution (~0.22 degrees), downscaled projections for regions worldwide. Data from these simulations will be available in the CMIP6 outcome.

42. The **CORDEX Africa Impacts Atlas** continues to develop, providing information through a web visualization about the regional climate over West Africa and its impact on agriculture in terms of crop suitability at global mean temperatures of 1.5°C, 2°C and 4°C above pre-industrial. The prototype atlas is currently being tested internally and will be opened for external testing when appropriate. On completion of the agriculture-focused prototype, atlases for other sectors (hydrology, health) will be developed as funding facilitates.

#### *Urban Climate Information to Support Local to Global Decisions and Policies*

43. A session at the IPCC Cities and Climate Change Science Conference (see paragraph 55) discussed the need to identify one or more **urban-scale Essential Climate Variables**<sup>37</sup> (ECVs)/ **indicators** that can represent human adaptation to climate change in cities. Several possible ECVs have been identified, mainly related to physical characteristics of the urban environment. The provision of robust bio-physical and/or socio-economic ECVs/indicators will feed directly into local and global climate change policy, such as through monitoring urban environmental change/adaptation progress through time and possibly against targets.

44. Key challenges include finding robust ECVs on urban adaptation that relate to socio-economics to represent human adaptation in cities, and can represent the diversity of global cities (which may not be possible for reasons of complexity or data availability). Development of a socio-economic ECV would require the assistance/advice of relevant stakeholders across the finance and insurance sectors and resources would be required to reliably operationalize the gathering of relevant ECVs into the future. A causative link between chosen ECVs/indicators and the adaptation action would be required.

45. The foundation of urban-scale climate information is the current high-resolution urban downscaling expertise, combined with local-impact models, and ensemble dynamical and statistical downscaling. This

<sup>37</sup> Essential Climate Variables (ECVs) – the minimum set of variables, observed at global scale, to describe the Earth's climate system. Observation of ECVs is administered by Global Climate Observing System (GCOS). See implementation plan: [https://library.wmo.int/opac/doc\\_num.php?explnum\\_id=3417](https://library.wmo.int/opac/doc_num.php?explnum_id=3417).

combination enables the propagation of climate change and uncertainty from global to the city scale. The community effort is under way to identify critical knowledge gaps around downscaling to city-scales and how to assess and reduce uncertainties, in view of providing input to future IPCC scientific assessments.

#### *Young climate scientists' contribution to the global efforts*

46. WCRP supports the participation of **early career researchers** in climate science. The IPCC-PROVIA-Future Earth workshop in Stockholm in 2016<sup>38</sup>, resulted in a series of initiatives from and for early career researchers: a webinar<sup>39</sup> introducing how early career researchers could be more involved in the IPCC process, a global survey,<sup>40</sup> as well as expert interviews on how to contribute to IPCC, the outcomes of which will be published soon in a scientific article. The WMO is supporting an Early Career Workshop in May 2018<sup>41</sup>, which builds on the early career perspective outlined in a recent BAMS paper.<sup>42</sup> Involvement of early career researchers in various steering committees has also been encouraged.

#### **Global Carbon Project**

47. The Global Carbon Project<sup>43</sup> assists the international science community to establish a common, mutually agreed knowledge base on anthropogenic carbon dioxide (CO<sub>2</sub>) emissions and their redistribution among the atmosphere, ocean, and terrestrial biosphere – the “**global carbon budget**” – so as to better understand the global carbon cycle, support the development of climate policies, and project future climate change.

48. The Global Carbon Atlas is a platform to explore and visualize the most up-to-date data on carbon fluxes resulting from human activities and natural processes.<sup>44</sup>

49. The Global Carbon Budget 2017<sup>45</sup> was published during COP 23 on 13 November 2017. **Global carbon emissions rose in 2017** after three years of little to no growth. Global emissions from all human activities will reach 41 billion tonnes in 2017, following a projected 1.5% [0.7 to 2.4%] rise in burning fossil fuels (last updated March 2018).

50. Carbon emissions are partitioned among the atmosphere and carbon sinks on land and in the ocean. However, there is still gaps in understanding in regards to how the sinks respond to a changing climate.<sup>46</sup> **The sinks have continued to grow so far with increasing emissions but with negative consequences for ecosystems**, such as impacts on ocean ecosystems due to ocean warming and ocean acidification.

#### **Future Earth**

51. Future Earth provides a global community of world-class researchers, projects and institutes brought together around an international research agenda focusing on sustainability science. Its 20 global research projects<sup>47</sup> include the Global Carbon Project as well as a number of other projects supporting ecosystem resilience, including Future Earth Coasts which focuses on global sustainability of the world's coastal zones.

52. Future Earth's **Knowledge-Action Networks**, alongside its projects, are the prime mechanism for delivering its research strategy. Topics for these networks include ocean, urban and natural assets.<sup>48</sup>

#### **Intergovernmental Panel on Climate Change**

53. The IPCC is celebrating its 30th anniversary in 2018. As part of this work, the IPCC are developing communication materials to help raise awareness about its work, activities and findings and support the efforts of stakeholders willing to organize relevant events.<sup>49</sup>

54. The IPCC have also produced a **Communications Handbook for IPCC scientists**, commissioned by Working Group I Technical Support Unit.<sup>50</sup> This is the first time such guidance has been produced.

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<sup>38</sup> IPCC-Future Earth-PROVIA Workshop on “Integrated research on climate risk and sustainable solutions across IPCC working groups: Lessons learnt from the AR5 to support the AR6” on 29–31 August 2016, Stockholm, Sweden. See <http://www.ipcc.ch/apps/eventmanager/documents/40/210920161045-INF.8-Provia.pdf>.

<sup>39</sup> See <http://www.yess-community.org/2017/07/10/the-ipcc-and-early-career-scientists-webinars>.

<sup>40</sup> See <http://www.yess-community.org/2017/02/02/how-to-get-more-ecrs-to-play-a-role-in-the-ipcc-process-a-survey>.

<sup>41</sup> See <http://www.gewexevents.org/events/2018conference/ecr/about>.

<sup>42</sup> See <http://journals.ametsoc.org/doi/10.1175/BAMS-D-16-0025.1>.

<sup>43</sup> See <https://www.globalcarbonproject.org>.

<sup>44</sup> See <https://www.globalcarbonatlas.org>.

<sup>45</sup> See <http://www.globalcarbonproject.org/carbonbudget/>.

<sup>46</sup> See <http://www.globalcarbonproject.org/carbonbudget/17/presentation.htm>.

<sup>47</sup> See <http://www.futureearth.org/projects>.

<sup>48</sup> See <http://futureearth.org/knowledge-action-networks>.

<sup>49</sup> See [http://www.ipcc.ch/news\\_and\\_events/30years.shtml](http://www.ipcc.ch/news_and_events/30years.shtml).

<sup>50</sup> See <https://climateoutreach.org/resources/ipcc-communications-handbook/>.



55. The 47th Session of the IPCC (IPCC-47) took place on 13–16 March 2018. Key outcomes of IPCC-47 include adoption of the terms of reference for the **new task group on Data Support for Climate Change Assessment** (TG-Data), formerly the Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA).

56. IPCC-47 also provided **guidance for the IPCC Data Distribution Center** (DDC) to archive and provide transparency, traceability, and stability of data and scenarios that are relevant in the context of the IPCC. It was also noted at the session that current in-kind contributions for the DDC are not sufficient for its currently planned activities.

57. The **IPCC Cities and Climate Change conference** took place on the 5–7 March 2018, Edmonton, Canada. It focused on four major themes: 1) cities and climate change; 2) urban emissions, impacts, and vulnerabilities; 3) solutions for the transition to low carbon and climate resilient cities; and 4) enabling transformative climate action in cities.

58. The conference brought together scientists, policymakers, researchers and development experts to assess the current state of academic and practice-based knowledge related to cities and climate change, identify key knowledge priorities, and chart a course forward for academic, practitioner and urban policy-making communities. It will also provide a basis for the **focus on cities as part of AR7**. The conference agreed that transformation needs to happen now and the specific needs for this transformation are shown in Table 2.<sup>51</sup>

59. The IPCC has recently selected its authors for the sixth assessment report (AR6). 721 experts from 90 countries will participate in AR6 as Coordinating Lead Authors, Lead Authors and Review Editors.<sup>52</sup>

<b>Table 2</b> Needs identified at the cities and climate change conference	
Inclusion and social transformation, focusing on:	<ul style="list-style-type: none"> <li>• Justice, equity</li> <li>• Power asymmetries and structural barriers</li> <li>• Most vulnerable populations &amp; ecosystems</li> <li>• The challenges and opportunities of informality</li> <li>• Innovative forms of governance and institutions</li> <li>• Improving evidence-based information</li> <li>• Boundaries of urban systems</li> </ul>
Exploring trade-offs and synergies of climate change mitigation & adaptation	<ul style="list-style-type: none"> <li>• Data, scenarios and modelling at the city level</li> <li>• Robust climate and urban information</li> <li>• Inequity in data gaps; mapping informal settlements</li> <li>• Potential and benefits of Nature-Based Solutions</li> </ul>
Funding & finance	<ul style="list-style-type: none"> <li>• Role of banks, insurance companies &amp; developers in climate action/inaction</li> <li>• Translation of costs &amp; benefits of climate actions across multi-economic sectors (e.g. private/finance)</li> </ul>

**Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services**

60. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services Plenary (IPBES-6) took place on 18 to 24 March 2018, Medellin, Colombia. It considered **5 major IPBES assessment reports**.<sup>53</sup>

(a) The four IPBES regional assessment reports covering the Americas, Asia and the Pacific, Africa, and Europe, and Central Asia evaluate the status of biodiversity and nature’s contributions to good quality of life in each region and their respective subregions. The reports describe current status and trends, as well as their links to drivers of change and threats, and policy-relevant issues affecting them. The analyses start by looking back several decades and then project likely interactions between people and nature for decades into the future, based on different decision pathways.

(b) The IPBES assessment report on land degradation and restoration, identifies threats to land-based ecosystems, offering evidence from around the world and a range of best-available solutions to reduce the environmental, social and economic risks and impacts of land degradation. It will help all decision makers to make more informed choices about how to halt and reverse land degradation.

<sup>51</sup> See <https://citiesipcc.org/news/press-release-world-scientists-local-leaders-map-research-agenda-for-cities-and-climate-change-for-coming-years/>.

<sup>52</sup> See [http://www.ipcc.ch/news\\_and\\_events/pr\\_ar6\\_authors.shtml](http://www.ipcc.ch/news_and_events/pr_ar6_authors.shtml).

<sup>53</sup> See <https://www.ipbes.net/event/ipbes-6-plenary>.

61. A global assessment on biodiversity and ecosystem services will be published in 2019 and presented at IPBES-7.

#### **Convention on Biological Diversity**

62. The Convention on Biological Diversity (CBD), as agreed at the UN Biodiversity Conference in Mexico in 2016,<sup>54</sup> are working on actions that will accelerate implementation of the Aichi global biodiversity targets,<sup>55</sup> and **enhance the linkage of the biodiversity agenda with other global agendas** including the Sustainable Development Goals and the Paris Climate Agreement. The current focus is on mainstreaming biodiversity into agriculture, fisheries, forestry and tourism.<sup>56</sup>

63. At the upcoming UN Biodiversity Conference in December 2018, in Egypt, the CBD will consider the IPBES reports in relation to the Aichi targets, the fourth edition of the Global Biodiversity Outlook and policy options available to deliver the 2050 Vision of the Strategic Plan for Biodiversity 2011–2020. The CBD will also focus on expanding the mainstreaming biodiversity agenda into other key sectors such as, energy and mining, infrastructure, manufacturing and processing, and health.

#### **Intergovernmental Oceanographic Commission**

64. The Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO) is the UN body specializing in international cooperation and programmes in oceanographic research, ocean observations, services, capacity development and transfer of marine technology.

65. The recently produced **Global ocean science report**,<sup>57</sup> compiled by the IOC, provides a comprehensive view of ocean science capacities at the national and global levels. It identifies that ocean sciences are led by a small number of industrialized countries although collecting data and taking the measure of the ocean's health is a global priority considering the economic and environmental stakes involved. The Report advocates increased investment into research and calls for greater international scientific cooperation so as to help to ensure a healthy, sustainable ocean.

66. The United Nations proclaimed, on 6 December 2017, the **Decade of Ocean Science for Sustainable Development (2021–2030)**, and invited the IOC/UNESCO to coordinate its preparation. This Decade will provide a framework for international coordination and partnership to reinforce research capacities in marine sciences and the transfer of technology. It will gather ocean stakeholders worldwide behind a common framework that will ensure ocean science can fully support countries in the achievement of all Sustainable Development Goals related to the ocean, including SDG 14 on the ocean, but also related ones such as SDG 13 on climate action.<sup>58</sup>

#### **United Nations Convention to Combat Desertification**

67. The United Nations Convention to Combat Desertification (UNCCD) Science-Policy Interface (SPI)<sup>59</sup> promotes dialogue between scientists and policy makers on desertification, land degradation and drought (DLDD).

68. The SPI developed the scientific conceptual framework for the UNCCD's Land Degradation Neutrality (LDN) approach that promotes measures to conserve, sustainably manage and restore land emphasizing the importance of smart land use planning.<sup>60</sup> The framework focuses on the supporting processes required to deliver LDN, including biophysical and socio-economic aspects, and their interactions. In planning interventions, it is important to consider resilience to, for example, the potential impacts of climate change, and the likely trade-offs between biodiversity and ecosystem services.

69. Focused action towards achieving LDN (SDG target 15.3) could be a starting point when reporting on INDCs implementation. The UNCCD continues to offer support to countries, through its capacity building programmes, for the development and monitoring of land components in their INDCs.

#### **United Nations Human Settlements Programme**

70. The new urban Agenda, adopted at the United Nations Conference on Housing and Sustainable Development (Habitat III) in Quito, Ecuador, in October 2016, sets out a common vision and global standards for urban development in the coming decades.<sup>61</sup> Together with the 2015 agendas – the Paris Agreement, the Sendai

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<sup>54</sup> See <https://www.cbd.int/cop/>.

<sup>55</sup> See <https://www.cbd.int/sp/targets/>.

<sup>56</sup> See <https://www.cbd.int/doc/press/2016/pr-2016-12-18-un-bidov-conf-en.pdf>.

<sup>57</sup> See <https://en.unesco.org/gosr>.

<sup>58</sup> See <https://en.unesco.org/ocean-decade>.

<sup>59</sup> See <https://knowledge.unccd.int/science-policy-interface>.

<sup>60</sup> See <https://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality-report-science-policy>.

<sup>61</sup> See <http://habitat3.org/the-new-urban-agenda>.

Framework for Disaster Risk Reduction and the SDG agenda – it is one of the main frameworks that will support the implementation of the United Nations vision for a resilient and sustainable future.

71. UN Habitat organised the ninth session of the World Urban Forum 7–13 February 2018 in Kuala Lumpur, Malaysia. The forum identified that cities are central to the implementation of the Paris Agreement. Three billion people will be arriving in cities in the next three decades. Urban planning as well as the investments made today in urban infrastructure will have a major impact on future climate-resilience and greenhouse gas emissions. Actions need to be taken now towards more integrated urban planning and its implementation. The Kuala Lumpur declaration identifies responding to environmental degradation and climate change as an urgent concern.<sup>62</sup>

### United Nations Environment

72. As highlighted in paragraph 23, UNEP, through its Global Adaptation Network, is supporting the LAKE initiative in a range of subregions.

73. The UNEP CMC<sup>63</sup> provide authoritative information about biodiversity and ecosystem services in a way that is useful to decision makers who are driving change in environment and development policy. A poster will be presented at RD 10.

74. Relevant publications by UNEP in 2017 include the 2017 mitigation gap report,<sup>64</sup> which highlights the importance of using science to guide decisions and set targets; the 2017 adaptation gap report,<sup>65</sup> which highlights the importance of science to support global adaptation assessment. UNEP also published the report on Renewable Energy and Energy Efficiency in Developing Countries: Contributions to Reducing Global Emission,<sup>66</sup> which draws from other research initiatives and the International Energy Agency's (IEA) 2017 Energy Technologies Perspective (ETP) report to provide criteria for 1.5°C and 2°C-compatibility at the sector level and demonstrates how these criteria could be applied to renewable energy and energy efficiency projects.

### World Meteorological Organization

75. The World Meteorological Organization (WMO) issued its annual statement on the state of the global climate<sup>67</sup> on 23rd March 2018. In a clear sign of continuing long-term climate change caused by increasing atmospheric concentrations of greenhouse gases, 2015, 2016 and 2017 have been confirmed as the three warmest years on record. Whilst 2016 still holds the global record (1.2°C above preindustrial era), 2017 was the warmest year without an El Niño (1.1°C above preindustrial era). A consolidated analysis by the WMO of five leading international datasets showed that the global average surface temperature in 2017 was approximately 1.1° Celsius above the pre-industrial era.

76. Most hazard-related loss and damage globally is associated with hydro-meteorological hazards and extreme events. Consequently, systematically tracking losses and damages associated with these events globally is important for major policy frameworks, including the UNFCCC, the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction. These frameworks recognize the importance of averting, minimizing and addressing loss and damage associated with hydro-meteorological hazards and the adverse effects of climate change, including extreme weather and slow onset events.

77. In November 2017, the WMO Commission for Climatology and the Commission for Basic Systems convened and co-chaired an international workshop on cataloguing and managing information on extreme events.<sup>68</sup> The main output from the workshop was an **innovative approach for cataloguing high-impact events** which leverages international standards and which is versatile and flexible enough to account for complex relationships among various event types. WMO has submitted this innovative approach to the L&D Excom.

78. The Paris Agreement in article 4 calls for enhanced transparency related to the accounting for anthropogenic emissions and removals towards the global stocktake exercise. SBSTA 47 recognized the “increasing capability to systematically monitor greenhouse gas concentrations and emissions, through in situ as well as satellite observations, and its relevance in support of the Paris Agreement”.<sup>69</sup> WMO are creating a global system to measure the effectiveness of climate action. As part of this work, WMO has initiated the Integrated Global Greenhouse Gas

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<sup>62</sup> See <http://wuf9.org/kuala-lumpur-declaration/>.

<sup>63</sup> See <https://www.unep-wcmc.org/>.

<sup>64</sup> See <https://www.unenvironment.org/resources/emissions-gap-report>.

<sup>65</sup> See <https://www.unenvironment.org/resources/report/adaptation-gap-report-2017>.

<sup>66</sup> See [https://wedocs.unep.org/bitstream/handle/20.500.11822/22149/1\\_Gigaton\\_Third%20Report\\_EN.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/22149/1_Gigaton_Third%20Report_EN.pdf?sequence=1&isAllowed=y).

<sup>67</sup> See [https://library.wmo.int/opac/index.php?lvl=notice\\_display&id=20220#\\_WrtI7n9rxhF](https://library.wmo.int/opac/index.php?lvl=notice_display&id=20220#_WrtI7n9rxhF).

<sup>68</sup> See <http://www.wmo.int/pages/prog/wcp/wcdmp/meeting/international-workshop-extreme-events.html>.

<sup>69</sup> FCCC/SBSTA/2017/7.

Information System (IG3IS).<sup>70</sup> The quality of the IG3IS delivered information will depend heavily on significant enhancements or expansion of the GHG infrastructure. There are several countries and groups of countries that have successfully implemented the IG3IS approach for the estimation of methane and carbon dioxide emissions related to LULUCF.

#### **Some activities from the observation community relevant for research**

##### **Committee on Earth Observation Satellites**

79. The Committee on Earth Observation Satellites have published the CEOS Earth Observation Handbook Special 2018 Edition on Satellite Earth Observation in support of the sustainable development goals.<sup>71</sup>

##### **Global Climate Observing System**

80. GCOS continue to promote the global climate indicators: Global Surface Temperature, Ocean Heat, Atmosphere Carbon Dioxide, Sea Level, Ocean Acidification, Sea Ice Extent in the Arctic and Antarctic and Glacier Change; so as to communicate to the widest community the scope and rate of changes to the climate.

##### **Group on Earth Observations**

81. GEO continues to enhance and coordinate global Earth observation systems and promote broad, open data sharing in support of global policy priorities, including the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, and the SDGs.<sup>72</sup>

82. Several GEO activities are working towards the development of an integrated approach to climate mitigation and adaptation. These include the GEO flagships<sup>73</sup> that develop and provide services based on global policy mandates: GEO Biodiversity Observation Network (GEO BON); GEO Global Agricultural Monitoring Initiative (GEOGLAM); and Global Forest Observation Initiative (GFOI).

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<sup>70</sup> See <https://public.wmo.int/en/resources/bulletin/integrated-global-greenhouse-gas-information-system-ig3is>.

<sup>71</sup> See <http://eohandbook.com/sdg/>.

<sup>72</sup> See [http://earthobservations.org/documents/cop23/What%20is%20GEO\\_A2.pdf](http://earthobservations.org/documents/cop23/What%20is%20GEO_A2.pdf).

<sup>73</sup> See [http://www.earthobservations.org/geoss\\_wp.php](http://www.earthobservations.org/geoss_wp.php).

## Annex

### Themes and presentations from all meetings of the research dialogue to date<sup>1</sup> and suggested themes for future meetings.

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

<sup>1</sup> See <https://cop23.unfccc.int/topics/science/workstreams/research/research-dialogue>.

## Research and Systematic Observation

ResearchDialogue.2018.1.InformationNote

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization	
		Research needs and priorities to support emerging issues under the UNFCCC: views by Parties	<a href="#">Needs for research and systematic observation</a>	Birama Diarra	Mali on behalf of LDCs	
			<a href="#">AOSIS concerns and issues for consideration</a>	Clifford Mahlung	Jamaica on behalf of AOSIS	
			<a href="#">Overview of Research Needs to address Climate Change: The case for Botswana</a>	David Lesolle	Botswana	
			<a href="#">Blue Carbon: Consideration in SBSTA</a>	Federica Bietta	Papua New Guinea	
			<a href="#">Policy-making relevant questions to the socio-economic scientific community</a>	José Romero	Switzerland	
		Good practices and challenges in communicating climate change research results	<a href="#">Developments on the Global Framework for Climate Services: Communicating climate information</a>	Mannava Sivakumar	WMO	
			<a href="#">Communicating climate science to policy makers: A success story from the IAI collaborative research in the Americas</a>	Ione Anderson	IAI	
			<a href="#">Communicating scientific knowledge and needs for research on vulnerability, impacts and adaptation</a>	Cynthia Rosenzweig	PROVIA	
		Collaboration with and opportunities for building research capacity in developing countries	<a href="#">Enhanced research capacity building in developing countries in the Asia-Pacific: Success stories</a>	Andrew Matthews	APN	
			<a href="#">Capacity building for adaptation research: START's African Climate Change Adaptation Fellowship Programme</a>	Jon Padgham	START	
		Needs and priorities for enhanced research capacity and for enhanced science-policy dialogue: views by Parties	<a href="#">Enhanced science-policy dialogue and communication</a>	Katrine Krogh Andersen	Denmark	
		36	4	Conveying emerging research findings and activities: 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	<a href="#">Low stabilization and new long term scenarios from the IPCC special report on renewables (SRREN)</a>	Jan Minx
<a href="#">State of the community driven scenario process: New framework for future scenario development for the AR5</a>	Tom Kram				IPCC	
<a href="#">Results from research by the Earth System Science Partnership (ESSP) programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS) of relevance to the long term global goal</a>	Rik Leemans				ESSP	
<a href="#">Some results from the WCRP on climate modelling</a>	Adrian Simmons				WCRP	
<a href="#">Impacts and costs of climate change under different scenarios: results from selected FP7 projects (ClimateCost, IMPACT2C, etc.)</a>	Luca Perez				FP7	
Conveying emerging research findings: Coastal and marine ecosystems: Greenhouse gas sources, sinks and reservoirs	<a href="#">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)</a>				Boone Kauffman	Coalition for Rainforest Nations
	<a href="#">Development of marine sciences in South America: Ocean, climate and fisheries - the Patagonia Shelf case</a>				Alberto Piola	IAI
	<a href="#">Results from research by the ESSP and its partner programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS) on coastal and marine ecosystems - related research</a>			Rik Leemans	ESSP	

## Research and Systematic Observation

ResearchDialogue.2018.1.InformationNote

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
		Updates from recent climate change research: Other areas of relevance to the Convention, including research-related capacity building	<a href="#">Overview of recent results from research by the ESSP and its partner programmes (ESSP, WCRP, IGBP, IHDP, DIVERSITAS and START)</a>	Rik Leemans	ESSP
			<a href="#">New Climate Change Synthesis Report for policy makers in Asia-Pacific Region and initiatives for capacity development</a>	Andrew Matthews	APN
			<a href="#">Observed changes in the climate system. Global sea-level rise and permafrost thawing: results from Ice2Sea and outlook to PAGE21</a>	Luca Perez	FP7
			<a href="#">GHG monitoring from outer space: current outcome and future perspective</a>	Tatsuya Yokota	Japan
			<a href="#">Atmospheric measurements for emission estimation: real-world emission verification of halogenated greenhouse gases</a>	Brigitte Buchmann	Switzerland
			<a href="#">Needs for research on slow onset events, e.g. sea level rise</a>	Malia Talakai	Nauru, on behalf of AOSIS
			<a href="#">Priorities for vulnerability, impacts and adaptation research</a>	Cynthia Rosenzweig	PROVIA
38	5	Science updates: Recent developments in global climate information	<a href="#">Towards the Fifth Assessment report of the IPCC</a>	Jean-Pascal van Ypersele, Vice Chair	IPCC
			<a href="#">Global science updates from international research programmes and organizations - Including on global carbon budget, regional temperature timelines, sea-level rise, climate predictions, black carbon</a>	Sybil Seitzinger	IGBP and WCRP
		Emerging scientific findings: ecosystems and GHG emissions and removals from sources, sinks and reservoirs, including terrestrial ecosystems	<a href="#">Management of different terrestrial ecosystems under a changing climate</a>	Dmitry Zamolodchikov and Andrey Sirin	Russian Federation
			<a href="#">Estimation of carbon and their fluxes in tropical peatlands: Results from a Japan-Indonesia joint project</a>	Mitsuru Osaki	Japan
			<a href="#">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</a>	Sybil Seitzinger	IGBP, IHDP, DIVERSITAS
			<a href="#">Carbon fluxes in tropical dry forests and savannahs: Human, ecological and biophysical dimensions</a>	Arturo Sanchez-Azofeifa	IAI
		Needs for climate change research and developments in research-related capacity-building	<a href="#">Regional capacity development, new opportunities on adaptation</a>	Andrew Matthews	APN
			<a href="#">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</a>	Sybil Seitzinger	IGBP, WCRP and START
			<a href="#">Research priorities for vulnerability, impacts and adaptation</a>	Cynthia Rosenzweig	PROVIA
40	6	Science updates: recent developments in global climate information	<a href="#">Tropical Dry Forest Resilience and Water Use Efficiency</a>	Arturo Sanchez-Azofeifa,	IAI
			<a href="#">Emerging research findings: Extreme events</a>	Sybil Seitzinger/ Vladimir Ryabinin	IGBP / WCRP

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
			<a href="#">Report from the Joint GCOS/ Global Observation for Forest Cover and Land Dynamics (GOFC/GOLD) Workshop on 'Observations for Climate Change Mitigation'</a>	Carolin Richter	GCOS
			<a href="#">New approaches in climate prediction for better adaptation: near-term prediction and high-resolution ensembles</a>	Masahide Kimoto	Japan
		Emerging scientific findings: the polar regions	<a href="#">IPCC WGI findings on the polar regions: warming and polar amplification, permafrost, and sea ice changes</a>	Paul Hezel	IPCC
			<a href="#">IPCC WGII findings on the polar regions: ecosystem impacts of ocean warming and acidification</a>	Hans-Otto Pörtner	IPCC
			<a href="#">Arctic Change: A need for multi-sector collaboration</a>	Jeremy Wilkinson	British Antarctic Survey
			<a href="#">Integrated biodiversity and climate scenarios</a>	Sybil Seitzinger	DIVERSITAS
		Needs for climate change research and developments in research-related capacity building	<a href="#">Knowledge gaps identified in AR5</a>	Renate Christ	IPCC
			<a href="#">Caribbean Regional Climate Centre</a>	Carlos Fuller	CCCCC
			<a href="#">Climate change research &amp; innovation in the Horizon 2020 programme</a>	Serena Pontoglio	EC, DG Research & Innovation
			<a href="#">New capacity building programme for APN</a>	Andrew Matthews	APN
42	7	Addressing data and information gaps, including from the IPCC <i>Guiding questions</i> a) What is the role of the ocean in the climate system and climate change? 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?	<a href="#">Efforts undertaken to address the information gaps in AR5</a> <a href="#">Confronting Urgent Climate Challenges</a>	Thomas Stocker David Carlson	IPCC WCRP and on behalf of Future Earth partners
			<a href="#">Linkages between Climate Change and Land Degradation</a>	Sergio Zelaya	UNCCD
			<a href="#">Human influence on extreme events: new approach by Probabilistic Event Attribution</a>	Masato Mori	Japan
			<a href="#">Downscaling of CMIP6 for regional climate modeling: experiences from CORDEX</a>	Claas Teichmann	EURO-CORDEX
			<a href="#">The KNMI Climate Explorer and International Climate Assessment &amp; Dataset</a>	Gé Verver	KNMI
		Lessons learned and good practices for knowledge and research capacity building <i>Guiding questions</i> 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?	<a href="#">Climate knowledge and innovation – research strategies in support of climate policy</a> <a href="#">Addressing global societal challenges through EU research funding</a> <a href="#">Some research-related messages from evaluation of the status of the Global Observing System for Climate</a> <a href="#">Capacity Development in Developing States in the Asia-Pacific Region: Some of the Issues</a> <a href="#">Climate Modelling in the Caribbean</a>	Vera Stercken Peter Horvath Adrian Simmons Andrew Matthews Carlos Fuller	Germany EC GCOS APN CCCCC



## Research and Systematic Observation

ResearchDialogue.2018.1.InformationNote

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
44	8	Conveying new scientific findings and research information in the light of the Paris Agreement <i>Guiding questions</i>	<b>Presentations</b>		
			<a href="#">Update on the Grand Challenges, CMIP6 and CORDEX</a>	David Carlson	WCRP
			<a href="#">Science Understanding and Gaps on Temperature Change</a>	Panmao Zhai / Valérie Masson-Delmotte	IPCC
		a) How are slow onset events observed and measured, what are the emerging research findings, gaps and needs in regards to risks and impacts, and what are the implications for vulnerable countries?	<a href="#">Global Climate Observing System: New findings &amp; Emerging needs</a>	Carolin Richter	GCOS
			<a href="#">Observational constraints on the global carbon budget and preliminary analysis of the 2015 anomaly</a>	Philippe Ciais	Global Carbon Project
		b) What are the opportunities to help countries reduce the uncertainties of their national greenhouse gas inventories to support implementation of the Paris Agreement?	<a href="#">Differences in climate impacts between 1.5°C and 2°C</a>	Gerald Lindo	AOSIS
			<a href="#">Implications from climate - carbon cycle modelling on socioeconomic scenario development</a>	Michio Kawamiya	Japan
		c) What climate change indicators and climate services can support action at the national level	<b>Posters</b>		
			<a href="#">The Systematic Observation of Climate from Space</a>	Pascal Lecomte	CEOS
			<a href="#">INDCs and pathways to different temperature targets</a>	Helene Benveniste	France
			<a href="#">GCOS and the UNFCCC: The new Implementation Plan and the Paris Agreement</a>	Simon Eggleston	GCOS
			<a href="#">The GEO Carbon and GHG Initiative as a contribution to UNFCCC</a>	Antonio Bombelli	GEO
			<a href="#">Pathways for achieving the Paris Agreement's Article 2 and 4 goals</a>	Joeri Rogelj	IIASA
			<a href="#">The Shared Socioeconomic Pathways: An Overview</a>	Joeri Rogelj	IIASA
			<a href="#">Using atmospheric observations to assess fossil fuel CO2 emissions in California</a>	Heather Graven	Imperial College London
			<a href="#">Sea level in a changing climate: AR5 and recent scientific advances</a>	Valérie Masson-Delmotte	IPCC WG I
			<a href="#">Drought in a changing climate: AR5 and recent scientific advances</a>	Valérie Masson-Delmotte	IPCC WG I
			<a href="#">Probabilistic information on climate change in extreme events by high-resolution large ensemble simulations</a>	Ryo Mizuta	Japan
			<a href="#">Probabilistic impacts assessment of low emission pathways</a>	Katja Frieler	PIK
			<a href="#">New Shared Socioeconomic Pathways in WCRP's Coupled Model Intercomparison Project</a>	David Carlson	WCRP
			<a href="#">Recent Surprises in Our Climate System</a>	David Carlson	WCRP
			<a href="#">Progress on the Integrated Global Greenhouse Gas Information System (IG3IS)</a>	Deon Terblanche	WMO
		Supporting scientific knowledge and capacity building in the light of the Paris Agreement <i>Guiding questions</i>	<b>Presentations</b>		
			<a href="#">Knowledge and capacity building in developing countries</a>	Maxx Dille	WMO/GFCS
			<a href="#">Connecting Science to People</a>	Ione Anderson	IAI
		a) What would be effective climate services from the international community to support international, regional, national and local climate change decision-making?	<a href="#">Research &amp; Capacity Building: Climate Adaptation and Slow Onset Events</a>	Andrew Matthews	APN
			<a href="#">Slow onset events: Perspectives from the Pacific</a>	Espen Ronneberg	SPREP
			<a href="#">Climate Services: European Research &amp; Innovation</a>	Diogo de Gusmao-Soerensen	EC
		b) How can regional and local knowledge and capacity be improved?	<a href="#">Translating Climate Science into Useful Products and Services</a>	Marian Westley	NOAA

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
		c) How can south–south cooperation be promoted to support knowledge -sharing and capacity-building on slow onset events?	<b>Posters</b>		
			<a href="#">Reducing emissions from agriculture to meet ambitious limits on global temperature increase</a>	Meryl Richards	CGIAR
			<a href="#">European Commission Climate Services</a>	Diogo de Gusmao-Soerensen	EC
			<a href="#">Work towards slow onset events</a>	Monika Antosik,	L&D ExCom
			<a href="#">Work towards catalyzing further action</a>	Dawn Pierre-Nathoniell and Idy Niang	L&D ExCom
			<a href="#">Contrasting futures for ocean and society from slow-onset climate-related changes</a>	Alexandre Magnan	France
			<a href="#">Combining local and scientific knowledge to increase adaptive capacity to global changes among farmers in Mesoamerica</a>	Edwin Castellanos	IAI / Guatemala
			<a href="#">Translating climate research into useful products and services</a>	Marian Westley	NOAA
			<a href="#">Wetlands help reduce drought</a>	Edmund Jennings	RAMSAR
			<a href="#">Reducing risk and impacts of climate-related disasters: Making space-based observations usable in developing countries - The agricultural drought example</a>	Joachim Post	UN-SPIDER
			<a href="#">How does Climate Change Affect Migration in the Pacific</a>	Robert Oakes	UNU-EHS
			<a href="#">YESS - Young Researchers Address the Future of Earth System Science</a>	David Carlson	WCRP
			<a href="#">The Global Framework for Climate Services (GFCS)</a>	Maxx Dilley	WMO/GFCS
46	9	1. Regional climate research data and information, and gaps.  <i>Guiding questions</i> 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?	<b>Presentation</b> <a href="#">WMO Global to regional climate services for better climate change adaptation and risk management</a>	Andre Kamga Foamouhoue	WMO/ ACMAD
			<b>Posters</b> <a href="#">The WCRP Grand Challenge on Understanding and Predicting Weather and Climate Extremes</a>	David Carlson	WCRP
			<a href="#">Regional Climate Downscaling through Arctic-CORDEX</a>	David Carlson	WCRP
			<a href="#">The EURO-CORDEX initiative: A new generation of regional climate scenarios for Europe</a>	David Carlson	WCRP
			<a href="#">Africa needs to rehabilitate the observation network</a>	Andre Kamga Foamouhoue	WMO/ ACMAD
			<a href="#">Prevention, preparation and response to disaster using climate outlooks</a>	Andre Kamga Foamouhoue	WMO/ ACMAD
			<a href="#">Climate services for meningitis epidemic surveillance and control in Niger</a>	Andre Kamga Foamouhoue	WMO/ ACMAD
			<a href="#">Climate Activities and Services in Beijing Climate Center</a>	Zhiqiang Gong	Beijing Climate Center (BCC)

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
			<a href="#">Climate research gaps and opportunities to support risk management and adaptation in Latin American countries</a>	Juan José Nieto	CIIFEN
			<a href="#">The WMO RAVI Regional Climate Centre Network</a>	Stefan Rösner	RAVI Regional Climate Centre Offenbach
			<a href="#">Recent findings of the “Snow, Water, Ice and Permafrost in the Arctic 2017 assessment”</a>	Morten Skovgård Olsen	AMAP
			<a href="#">Measure to Manage: A view from the Asia-Pacific</a>	Andrew Matthews	APN
			<a href="#">Decision making and adaptation planning decision support tools for the Caribbean</a>	Ulric Trotz	CCCCC
			<a href="#">Copernicus Climate Change Service - Developing drought, pest impact and phenological indicators for potential adaptation anywhere in the World</a>	Hugo Zunker	EU
			<a href="#">Regional effects of air pollution, disaster risk, and urban climate change</a>	Thorsten Kiefer	Future Earth
			<a href="#">Systematic observations: from global systems to local information</a>	Simon Eggleston	GCOS
			<a href="#">Contribute to improving systematic observations: capacity development through the GCOS Cooperation Mechanism</a>	Simon Eggleston	GCOS
			<a href="#">Open Earth observation data for regional climate research, mitigation and adaptation decision making</a>	Stefan Rösner	GEO
			<a href="#">Gap Filling through Collaborative Researches Using Non-Hydrostatic Regional Climate Model (NHRCM) and the Tokyo Climate Center (WMO Regional Climate Center)</a>	Atsuya Kinoshita	TCC - Japan
			<a href="#">Regional climate downscaling for risk information - Establishment of the CORDEX Asia Empirical-Statistical Downscaling (ESD) Group</a>	Koji Dairaku	Japan
			<a href="#">The impact of 2015-2017 El Niño on the regional ocean variability off Peru: A case study</a>	Sara Purca and Ione Anderson	IAI
			<a href="#">Added value of regional downscaling with COSMO-CLM in the context of CORDEX-Africa</a>	Hans-Jürgen Panitz	KIT
			<a href="#">ISIpedia - the climate impacts encyclopedia: presenting the upcoming 3rd phase of ISIMIP which includes regionalized evaluation and climate impacts information across sectors</a>	Jacob Schewe	PIK
			<a href="#">Regional impacts of climate change on hydrology: a model inter-comparison</a>	Jacob Schewe	PIK
			<a href="#">RCC developments and the CREWS initiative</a>	Ge Verver	KNMI
			<a href="#">Combining Traditional Knowledge and Meteorological Forecasts in the Pacific to Increase Community Resilience to Extreme Climatic Events</a>	Espen Ronneberg	SPREP
			<a href="#">Regional projections of global climate change for local adaptation response</a>	Ralf Döscher	SMHI
			<a href="#">WASCAL – West African Climate Service Center on Climate Change and Adapted Land Use. Regional Climate and Land Surface Information and Services</a>	Christiana Olusegun, Andreas Hirner	KIT/DLR
			<a href="#">Long-Term Observing Stations are a critical part of the climate puzzle</a>	Stuart Goldstraw	UK MetOffice
			<a href="#">UNISPACE+50 and its Thematic Priority “International Cooperation Towards Low-emission and Resilient Societies”: Role of Space Research and Technology</a>	Joachim Post	UN-SPIDER

**Research and Systematic Observation**  
 ResearchDialogue.2018.1.InformationNote

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
		2. Science to take stock and assess progress on mitigation.	<b>Presentation</b>		
			<a href="#">Mitigation pathways and sustainability in the context of the Paris Agreement</a>	Jim Skea	IPCC WG III
		<i>Guiding questions</i>	<b>Posters</b>		
		a) How can we take stock and assess progress on the Paris Agreement long-term mitigation goal (Article 4.1), including by using indicators?	<a href="#">Updated Scenario Planning and Current Schedules for CMIP6</a>	David Carlson	WCRP
			<a href="#">WCRP activities on decadal climate prediction</a>	Matthias Tuma	WCRP
			<a href="#">Key indicators to track current progress and future ambition of the Paris Agreement</a>	Glen Peters	CICERO
		b) How can science information support the facilitative dialogue 2018?	<a href="#">Identifying AFOLU emission hotspots in the tropics: where are they, how uncertain are they, and what can be done about it?</a>	Rosa Maria Roman Cuesta	CIFOR
		c) What are the emerging information, opportunities and cost estimates in addressing climate change in line with sustainable development?	<a href="#">Human-induced warming to date and implications for outstanding carbon budgets for 1.5°C</a>	Richard Millar	Universities of Exeter & Oxford
			<a href="#">Carbon budgets, historic baselines, and agricultural contribution to climate mitigation</a>	Thorsten Kiefer	Future Earth
		d) How do we consider the role of other short-lived climate forcers in reducing temperature?	<a href="#">Country-driven mid-century low-emission development strategies – Methods and insights from the Deep Decarbonization Pathways Project (DDPP)</a>	Henri Waisman	IDDRI
			<a href="#">An update on the process of creating a very low emission scenario for climate change research</a>	Joeri Rogelj	IIASA
			<a href="#">Understanding the origin of Paris Agreement emission uncertainties</a>	Joeri Rogelj	IIASA
			<a href="#">An overview of new work on climate and development linkages from the CD-LINKS project</a>	Volker Krey	IIASA
			<a href="#">Earth System Modeling to Contribute to the Paris Agreement in the Integrated Research Program for Advancing Climate Models</a>	Tomohiro Hajima	Japan
			<a href="#">Contribution to the Paris Agreement using space-based GHG monitoring</a>	Shamil Maksyutov	Japan
			<a href="#">Mitigation strategy under uncertainty and learning on climate sensitivity and damages</a>	Tommi Ekholm	VTT Technical Research Centre of Finland
			<a href="#">Understanding Changes in Climate (in support of the Global Stocktake)</a>	Amir Delju	WMO
48	10	1. Ecosystems: update on research and modelling and their importance for implementation of the Paris Agreement	<b>Presentations</b>		
			<b>Posters</b>		
		2. Strengthening the link between the research community and action to meet the goals of the Paris Agreement			
		3. Renewable energy economics and co-benefits			
		4. Global research on the carbon cycle, and its observation requirements, in support of the Paris Agreement			

**Research and Systematic Observation**  
 ResearchDialogue.2018.1.InformationNote

SBS TA	RD	Themes	Presentation and poster titles	Presenter	Organization
		<b>Themes suggested for future dialogues</b>			
			The role of the ocean in the climate system, including warming, acidification and rising sea level		
			Low emissions climate-resilient development: the human dimension (including social, behavioral, and cultural information).		
			Outputs from downscaling techniques for global climate reanalysis and models / Dynamical regional downscaling using reanalysis		
			Communicating climate change science		
			Building greater resilience to extreme events. Tropical cyclone impacts and measures for building resilience		
			Incorporating risk into asset management and investment decisions		
			Adaptation limits		
			Costing adaptation needs in developing countries		
			Mitigation and adaptation technologies necessary for achievement of the NDCs		
			Climate change attribution		