INTERNATIONAL SPACE SCIENCE INSTITUTE
Hallerstrasse 6 • CH-3012 Bern • Switzerland

Forum on Tipping Points in the Earth's Climate

26 – 29 January 2021

Biosphere Breakout

First name	Surname	Email	Interest
Annett	Bartsch	annett.bartsch@bgeos.com	My research focus is on remote sensing of the terrestrial Arctic, including soils, vegetation, lakes and snow. I have recently contributed to a review on tipping points and remote sensing, specifically to the permafrost part: Swingedouw, D., Speranza, C., Bartsch, A., Durand, G., Jamet, C., Beaugrand, G., Conversi, A. (2020): Early Warning from Space for a Few Key Tipping Points in Physical, Biological, and Social-Ecological Systems. *Surveys in Geophysics* 41, 1237–1284. https://doi.org/10.1007/s10712-020-09604-6 I am science lead for Permafrost CCI.
Benjamin	Poulter	benjamin.poulter@nasa.gov	Researcher in Earth Sciences Remote Sensing, at NASA Goddard Space Flight Center, co-chairs Future Earth's iLEAPS project and co-leads the ESA-NASA Arctic Methane Grand Challenge. My research addresses the role of vegetation dynamics on Earth system processes, i.e., carbon and nutrient cycling and climate feedbacks. I work with an ensemble of ecosystem models known as dynamic global vegetation models, or DGVMs, to explore hypotheses related to climate, disturbance, and land-cover change impacts on vegetation. DGVM models provide a useful approach to combine information from forest inventory, flux towers, and remote sensing, with ecological theory, to test predictions at multiple timescales in the past, present, and future.
Darren	Ghent	djg20@le.ac.uk	Senior research scientist at the National Centre for Earth observation, University of Leicester, Science lead for Land Surface Temperature CCI. Interests: land surface temperature data, from its retrieval to its exploitation, the interactions between the land-surface and the atmosphere in terms of the surface energy balance, carbon and water cycles. I am particularly concerned with validating land-surface temperature, both the products from Earth Observation and the simulations of land-surface models; developing improved land surface temperature algorithms, in particular being responsible for the algorithms for ESA instruments - AATSR and SLSTR; exploitation of land surface temperature in scientific and commercial applications; modelling the biogeochemical processes of terrestrial ecosystems; and climate feedbacks on various spatial and temporal scales.
Hannah	Liddy	hl3147@columbia.edu	Executive Officer of the AIMES project of Future Earth, based at NASA Goddard Institute of Space Studies at Columbia University.
Jakob	Zscheischler	jakob.zscheischler@climate.unibe.ch	Earth system scientist with a background in mathematics, biogeochemistry and climate science. My research focus are compound weather and climate events.

			Helmholtz Young Investigator Group leader at Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany, using machine learning to identify compounding meteorological drivers of extreme impacts such as floods, vegetation mortality and crop failure. SNF Ambizione Fellow at Climate and Environmental Physics, Physics Institute, University of Bern, Switzerland, Member of the Oeschger Centre for Climate Change Research and chair of European COST Action DAMOCLES (Understanding and modelling compound climate and weather events).
Jerome	Chave	Jerome.chave@univ-tlse3.fr	
Jonathan	Donges	donges@pik-potsdam.de	Co-Leader of the FutureLab on Earth Resilience in the Anthropocene and Working Group Leader on Whole Earth System Analysis in Research Department on Earth System Analysis of the Potsdam Institute for Climate Impact Research. He is interested in the dynamics of tipping elements in the climate and social systems, the potentials for emerging cascading interactions, and their implications for the resilience of the Earth system with respect to anthropogenic disturbances.
Juan	Rocha	juan.rocha@su.se	Research scientist at Stockholm Resilience Cenre, Future Earth - Earth Commission, and the Beijer Institute. Interests: understanding critical transitions, from regime shifts in ecological systems, to collective action in society. Currently he is focusing on the idea of cascading effects, this is how a critical transition in an ecosystem in the world can impact the likelihood of other ecosystems tipping over. He develops mathematical models to explore which interconnections are plausible. He is also looking for empirical signatures of cascading effects on trade networks and rainfall transport dynamics. Juan is interested in methods for identifying resilience surrogates - good observables that can tell you how resilient a system is - as well as misperceptions of feedbacks and their consequences.
Liviu	Stirbat	Liviu.STIRBAT@ec.europa.eu ; Rossella.PALAZZO@ec.europa.eu	EC's DG Climate (Adaptation to Climate Change unit)
Lorena	Moreira	lorena.moreira@issibern.ch	Postdoc at the International Space Science Institute, Bern, Switzerland.
Niklas	Boers	boers@pik-potsdam.de	Based at the Potsdam Institute for Climate Impact Research, he is Leader of the Future Lab 'Artificial Intelligence in the Anthropocene' and Associate coordinator of the Horizon 2020 project 'Tipping Points in the Earth System' (TiPES).
Peter	Cox	P.M.Cox@exeter.ac.uk	Professor of Climate System Dynamics in Mathematics at the University of Exeter. Interests: Interactions and feedbacks between the land-surface and climate; Dynamic Global Vegetation Modelling; Emergent constraints on climate-carbon cycle feedbacks.
Peter	Verburg	p.h.verburg@vu.nl	Professor, Vrije Universiteit Amsterdam, Swiss Federal Institute WSL. Future Earth 'Earth Commissioner', co-chair of the Global Land Programme of Future Earth. Interests: Land Use Modelling and land-use analysis, social-ecological dynamics.
Philippe	Ciais	philippe.ciais@lsce.ipsl.fr	Researcher of the Laboratoire des Sciences du Climat et de l'Environnement (LSCE), the climate change research unit of the Institut Pierre Simon Laplace (IPSL). He is a physicist working on the global carbon cycle of planet Earth, climate change, ecology and geosciences. Science lead for CCI RECCAP-2 project for analysis of regional carbon budgets, project leader of the Global Carbon Atlas for the Global Carbon Project of Future Earth.

Richard	Jones	richard.jones@metoffice.gov.uk	Science lead for Climate Modelling User Group (CMUG) CCI
Sebastian	Bathiany	sebastian.bathiany@hzg.de	Sebastian's scientific expertise focuses on the analysis of abrupt climate change, and on the interaction between atmosphere and vegetation. He obtained his PhD at the Max Planck Institute for Meteorology (MPI-M), studying the termination of the so-called green Sahara as an example for potential tipping events in the Earth System. Also at MPI-M and then the University of Wageningen, Sebastian assessed the potential for abrupt Arctic sea-ice loss, and the patterns and effects of changing climate variability. In a path-finding project with the Netherlands eScience Centre, he developed data-mining tools to detect and interpret abrupt climate shifts in complex climate datasets. He is now working at the Climate Service Center Germany where he develops informational products to help agricultural stakeholders adapt to climate change. Sebastian has a strong passion for what he calls climate edutainment - developing and performing entertaining and creative ways to communicate information about climate change.
Stephen	Briggs	sab238@cam.ac.uk	Professor Stephen Briggs holds visiting positions in the Department of Meteorology, University of Reading and the Department of Chemistry, Cambridge University. He is also a Fellow of University College London. He is Chairman of the Global Climate Observing System (GCOS) Steering Committee, a body set up by the UN to define and support observations for climate. He is also ad hominem Senior Adviser to the Chinese National Remote Sensing Programme and serves on the Advisory Board of the Global Terrestrial Network – Glaciers. He was Head of the Department of Earth Observation Science, Applications & Future Technologies at ESA where he was responsible for the exploitation of ESA missions, for the future EO technologies programme and for studies relating to future missions. He was also the interface between ESA's EO missions and its user communities in science, in government policy and in the private sector.
Tim	Lenton	t.m.lenton@exeter.ac.uk	Director and Professor at the Global Systems Institute, University of Exeter, Future Earth 'Earth Commissioner'. Interests: tipping points, climate modelling.
Victor	Brovkin	victor.brovkin@mpimet.mpg.de	Head of a group on Climate-Biogeosphere Interactions at the Max-Planck Institute for Meteorology and professor at the University of Hamburg, Germany, co-chair of the AIMES project of Future Earth. Interests: interactions between terrestrial ecosystems and the climate, including biogeophysical and biogeochemical feedbacks. In particular, understanding the role of high latitude ecosystems in the climate system, focusing on terrestrial and marine permafrost processes. He has developed global dynamic vegetation models and applied them for pioneering studies on stability of climate-vegetation system.
Wendy	Broadgate	wendy.broadgate@futureearth.org	Director of the Future Earth Global Hub, Sweden.

Ocean – Atmosphere and Biota Breakout			
First name	**Surname**	**Email**	**Interest**
Aixue	Hu	ahu@ucar.edu	Project scientist at National Center for Atmospheric Research, Boulder. Interests: polar climate, sea ice-ocean interaction, the North Atlantic Oscillation and its impact on the oceanic

			Meridional Overturning circulation, variations of the Thermohaline Circulation and their impacts on paleo, present and future climate.
Alessandra	Conversi	a.conversi@ismar.cnr.it	Expertise: Senior Researcher at CNR-ISMAR. Oceanographer working on climate, plankton, regime shifts, and science-policy interactions.
Anny	Cazenave	anny.cazenave@gmail.com	Expertise: use of satellite data to chart sea level rise, and related changes in ice sheets, landmasses and freshwater bodies. She is science lead for the Sea Level CCI project, and Director of ISSI's Earth Science Program.
Didier	Swingedouw	didier.swingedouw@u-bordeaux.fr	Interests: ocean and climate dynamics, with a focus on the thermohaline circulation (THC) in the past, present and future using state-of-the-art ocean-atmosphere-sea-ice-land coupled models (like IPSL-CM4, LOVECLIM and CNRM-CM3). Based at Universite de Bordeau
Gerard	McCarthy	gerard.mccarthy@mu.ie	Oceanographer working in ICARUS (Irish Climate Research and Analysis Unit), Maynooth University. Interested in the role of the ocean in climate, in particular, the role of the Atlantic Meridional Overturning Circulation in the climate of northwest Europe. Sea level rise. Ocean salinity.
Jonathan	Donges	donges@pik-potsdam.de	Co-Leader of the FutureLab on Earth Resilience in the Anthropocene and Working Group Leader on Whole Earth System Analysis in Research Department on Earth System Analysis of the Potsdam Institute for Climate Impact Research. Interested in the dynamics of tipping elements in the climate and social systems, the potentials for emerging cascading interactions, and their implications for the resilience of the Earth system with respect to anthropogenic disturbances.
Marti	Gali	marti.gali.tapias@gmail.com	Expertise: the interaction between marine microbial plankton and the Earth's climate. Since 2008, most of his research has focused on the upper-ocean biogeochemical cycling of dimethylsulfide (DMS), a biogenic gas that affects aerosols and clouds. He studied this topic by means of experiments and oceanographic cruises during his PhD (2012; Institut de Ciences del Mar, Barcelona, Catalonia, Spain) and by means of data syntheses, remote sensing and modelling during his postdoc (2013-2019; Laval University, Quebec, Canada). In 2018 he joined the Barcelona Supercomputing Center to study the fate of organic particles in the oceans' twilight zone by means of biogeochemical models and autonomous float observations. Bio-optics and light-driven biogeochemistry are cross-cutting themes in his research.
Martin	Stengel	Martin.Stengel@dwd.de	Remote sensing scientist based at DWD and Science lead for the Cloud CCI project.
Michaela	Hegglin	m.i.hegglin@reading.ac.uk	*Expertise:* Earth system science with focus on the chemistry-climate interactions. *Interest in this workshop:* *1) From a science point of view:* Potential tipping points primarily around the stratospheric ozone layer, but also other aspects of how Earth system processes could affect the capacity of the biosphere and ocean to act as CO2 sinks. *2) From a science coordination point of view:* How can we use models and measurements in concert to gain information on approaching tipping points in support of the UNFCCC Paris Agreement process?
Shubha	Sathyendran	shubha.sathyendranath@gmail.co	Remote sensing scientist based at Plymouth Marine Laboratory,

	ath	m	with research interests in ocean colour modelling, spectral characteristics of light penetration underwater, bio-optical properties of phytoplankton, modelling primary production, bio-geochemical cycles in the sea, climate change, biological-physical interactions in the marine system, ecological provinces in the sea, ecological indicators and phytoplantkon functional types. Science lead for the Ocean Colour CCI project.
Susanne	Mecklenburg	susanne.mecklenburg@esa.int	Head of the ESA Climate Office, responsible for delivery of ESA's Climate Change Initiative (CCI) programme and developing future programme activities with ESA Climate Office as the focal point for climate. Susanne is the ESA representative to the Joint CEOS/CGMS Working Group on Climate (WGClimate) and a member of the WCRP Data Advisory Council. She has a background in hydrology and use of ground-based radar to forecast rainfall for hydrological models. Susanne was previously the Mission Manager for SMOS, Sentinel 3 and FLEX.
Sybren	Drijfhout	S.S.Drijfhout@soton.ac.uk	Expertise: Stability of the Atlantic Meridional Overturning Circulation and abrupt climate change, developing climate change scenarios for the marine environment, including sea level rise.
Trude	Storelvmo	trude.storelvmo@geo.uio.no	I am a climate scientist, focusing my research on the role of aerosol particles and clouds in Earth's climate. I also work on questions related to cloud-climate feedback mechanisms (for which I received an ERC Starting Grant in 2018), as well as climate engineering involving aerosols and/or clouds, and on the Earth's transient and equilibrium climate sensitivity. In my research group, we carry out research on these topics using a wide range of research tools, but primarily Earth System Models and Satellite Remote Sensing. In a recent study combining these tools, we found evidence that a negative feedback currently acting in these clouds (and thus limiting warming) will weaken with sustained warming, and eventually cease altogether (https://www.nature.com/articles/s41561-020-00649-1?proof=t). In addition to the above research activities, I am currently a Coordinating Lead Author for Ch. 7 ("The Earth's energy budget, climate feedbacks, and climate sensitivity") of IPCC AR6 (WG1)."
Zarko	Kovac	zkovac@pmfst.hr	Research interests: carbon assimilation in phytoplankton primary production models.

Cryosphere Breakout			
First name	**Surname**	**Email**	**Interest**
Andreas	Kääb	a.m.kaab@geo.uio.no	Background as civil engineer from the Technical University of Munich and the ETH Zurich, and is currently professor at the Department of Geosciences, University of Oslo. He specializes in the remote sensing of cold regions, in particular glaciers, permafrost, rivers, and associated natural hazards. Andreas is among others partner in the ESA Glaciers_CCI and Permafrost_CCI projects, was lead author of the IPCC SROCC report, and held an ERC Advanced Grant about global glacier observations. He has special interest in climate change impacts on the cryosphere and feedbacks that lead to its fast changes, not least those associated with the current Arctic Amplification of global atmospheric warming.

Andrew	Shepherd	A.Shepherd@leeds.ac.uk	Science lead for the Antarctic Ice Sheet CCI project and co-lead for ESA-NASA Ice Sheet Mass Balance Inter-comparison Exercise, based at the University of Leeds. Expertise in developing remote observations of the cryosphere, with particular emphasis on the quantitative techniques of radar interferometry and radar altimetry. I have also worked on studies of arid land degradation using satellite infrared radiometry and models of atmospheric radiative transfer, and I have led satellite validation campaigns in Europe, Africa, and Antarctica.
Petra	Langebroek	pela@norceresearch.no	Petra is a senior researcher at NORCE Norwegian Research Centre AS and Bjerknes Centre for Climate Research in Bergen (Norway). Her research focuses on (in)stability of ice sheets and how they interact with climate. She is a numerical modeller, has worked on various time scales (Eocene-Oligocene, Miocene, Eemian, and present-day), on both the Antarctic and the Greenland ice sheets, to understand ice sheet and climate processes. Currently Petra is coordinating the Horizon 2020 project TiPACCs, to investigate the tipping points in the Antarctic continental shelf seas and the Antarctic Ice Sheet. It aims to improve understanding of these tipping points, their interaction, and (eventually) provide a list of early warning indicators for Tipping Points in these Antarctic components. More information: www.tipaccs.eu and www.norceresearch.no/en/persons/petra-langebroek
Ricarda	Winkelmann	ricarda@pik-potsdam.de	Professor of climate system analysis at Potsdam Institute of Climate Impact Research (PIK) and University of Potsdam, Germany, Future Earth 'Earth Commissioner'. Interests: Ice dynamics and ice sheet modelling, sea-level change, tipping points.
Roland	Kupers	info@rolandkupers.com	Interests: Complexity, Resilience, Energy Transition. Global Advisor to the Methane Environmental Defense Fund, Institute for Advanced Study - University of Amsterdam. New Book: A Climate Policy Revolution: What the Science of Complexity Reveals about Saving the Planet (Harvard University Press, 2020).
Sophie	Hebden	sophie.hebden@esa.int	Future Earth liaison to ESA, seconded to the ESA Climate Office. Communication and coordination.
Stephen	Briggs	sab238@cam.ac.uk	Professor Stephen Briggs holds visiting positions in the Department of Meteorology, University of Reading and the Department of Chemistry, Cambridge University. He is also a Fellow of University College London. He is Chairman of the Global Climate Observing System (GCOS) Steering Committee, a body set up by the UN to define and support observations for climate. He is also ad hominem Senior Adviser to the Chinese National Remote Sensing Programme and serves on the Advisory Board of the Global Terrestrial Network – Glaciers. He was Head of the Department of Earth Observation Science, Applications & Future Technologies at ESA where he was responsible for the exploitation of ESA missions, for the future EO technologies programme and for studies relating to future missions. He was also the interface between ESA's EO missions and its user communities in science, in government policy and in the private sector.
Thomas	Lavergne	thomas.lavergne@met.no	Expertise: sea-ice cover observations (Science Leader for Sea Ice CCI project), and although it is clear that the Arctic sea ice (especially the summertime cover) is changing dramatically because of anthropogenic forcing, the current state of knowledge indicates it would recover (at least stabilize) rather swiftly if we

			were to succeed in cutting our emissions. Nevertheless the sea-ice cover might be a tipping element for other aspects of the bio/geo-sphere. How sea-ice is considered "at a tipping-point" vs "a tipping element" is one of the interrogations I have for this workshop.
Thomas	Nagler	thomas.nagler@enveo.at	EO Science lead for the Greenland Ice Sheet CCI project, based at ENVEO, Austria.