

GEWEX DATA ANALYSIS PANEL

Report to the SSG



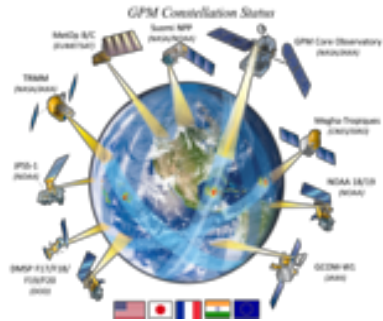
Rémy Roca (CNRS) remy.roca@legos.obs-mip.fr



Tristan L'Ecuyer (UW-AOS) tristan@aos.wisc.edu

and the panel members

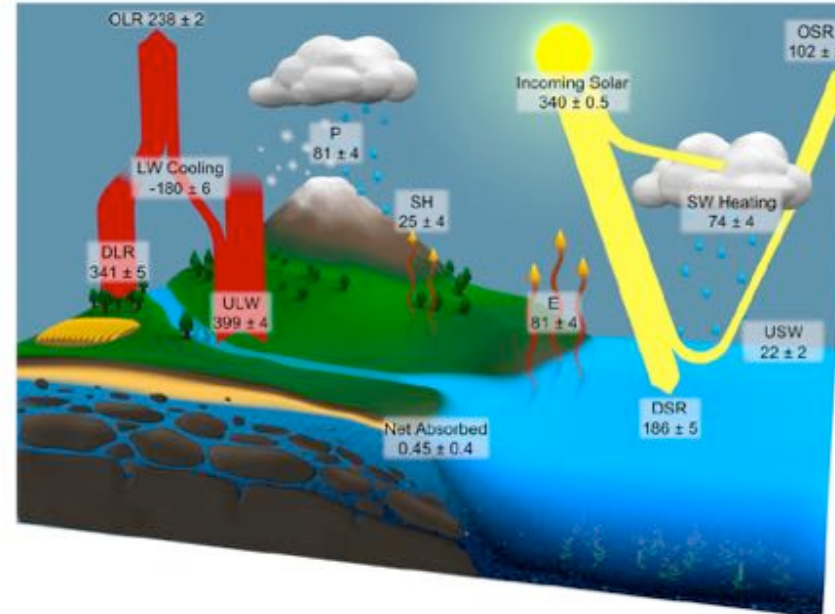
Precipitation



1 NOVEMBER 2015

L'ECUYER ET AL.

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Sea level



Radiation



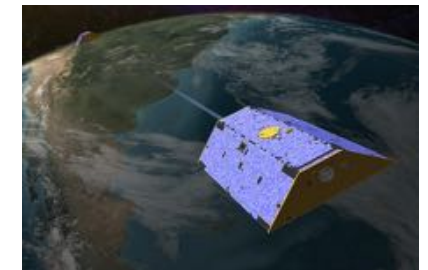
Surface Flux



Cloud



Gravimetry



1- Overview

Focus 1: Extreme precipitation

Focus 2: EEI

2- Outcome of the GDAP annual meeting

Continuation of the Rescoping of GDAP

Status assessments & networks

New initiatives

A very busy year for GDAP chairs!

When	Where	What	Role
Jan	Washington, US	GEWEX SSG	Participant
March	Geneva, Switzerland	WDAC-7 meeting, including the SP discussion	Participant
May	Canmore, Canada	GEWEX OSC: Sessions co-chairing & General presentation	Science committee & Session Chair
July	Offenbach, Germany	Joint GC Extremes and GDAP meeting on remote sensing of precip extreme	Lead Organizer
July	Boulder, USA	BSRN science conference in Boulder	Participant
Nov	Toulouse, France	WCRP/CLIVAR/GEWEX workshop “The Earth Energy Imbalance and its Implications”	Lead Organizer
Nov	Lisboa, Portugal	2018 GDAP meeting	Lead Organizer
Dec	Washington DC, US	AGU co-chair session: EEI (Tristan) Global water budget (Remy) link to SS	Session Chair

A very busy year for GDAP chairs!

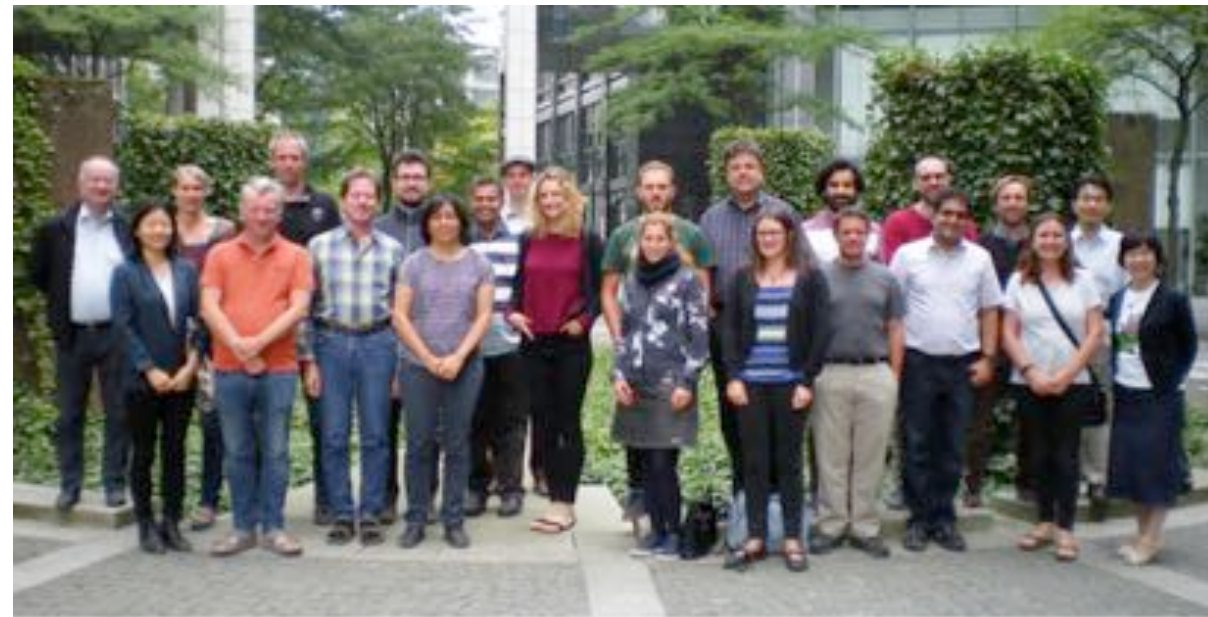
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Joint GC Extremes and GDAP meeting (1/3)

WCRP Workshop with Lisa Alexander and Sonia Senevirante
GDAP/IP WG and GC Extremes
Hosted by CMSAF/DWD in Offenbach in July 2018

The workshop objectives were to:

- Identify the form of a new International Precipitation Working Group (IPWG)/GEWEX Precipitation assessment chapter on extreme precipitation, including the selection of chapter leads and other contributors
- Finalize a best practice guidance document for the WCRP Extremes GC on data use for assessing precipitation extremes, including the consideration of satellite-based measurements
- Integrate the efforts of the remote sensing community in the literature on precipitation extremes that will be assessed for the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6)

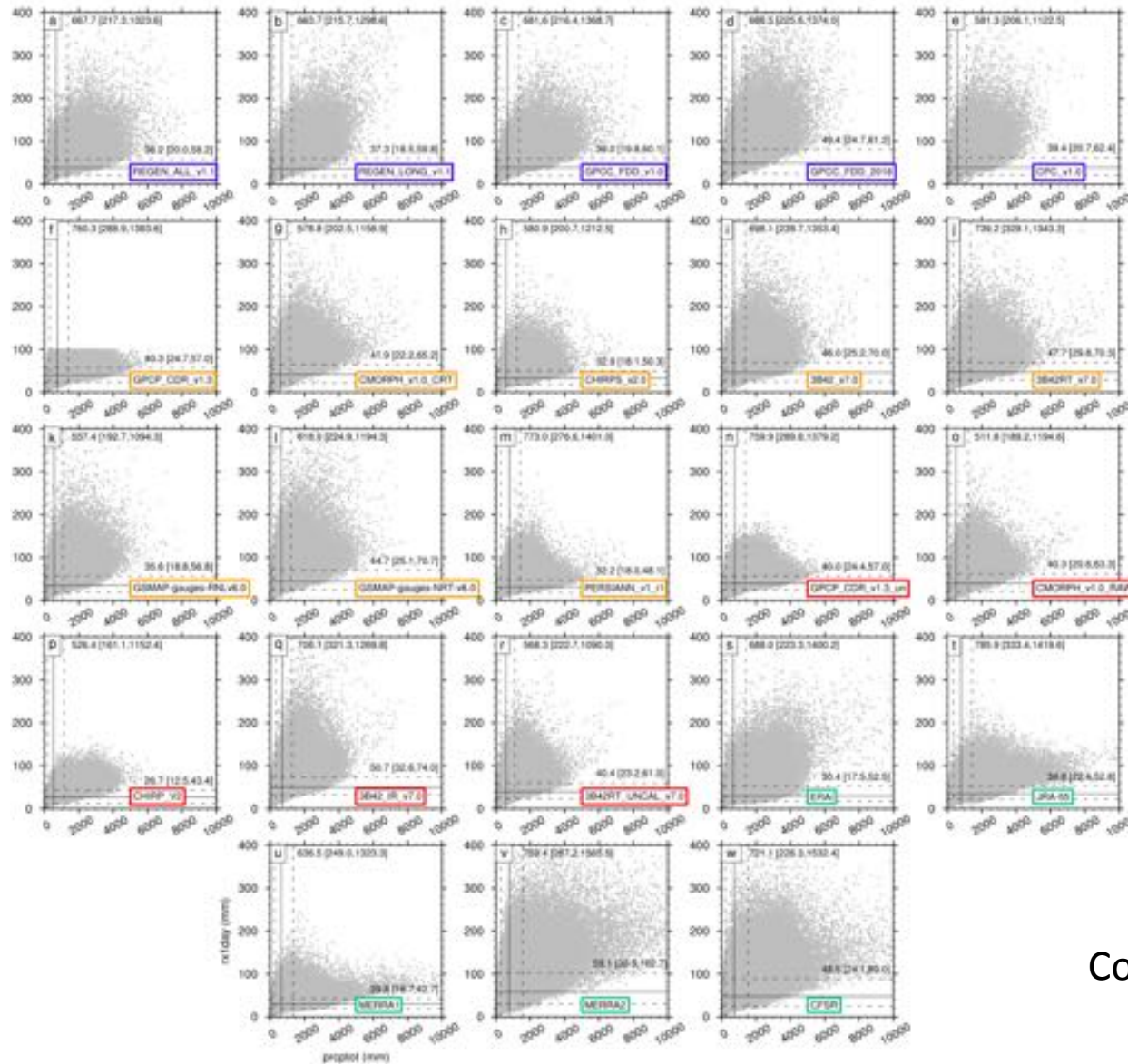


Participants of the Precipitation Extremes Workshop

<https://www.gewex.org/gewex-content/uploads/2018/08/Aug2018.pdf>

A database with more than 20 gridded precipitation products
A new chapter of the IPWG/GEWEX Precip Assessment
A Special Issue ~12 papers
Many feedbacks to data developers

Joint GC Extremes and GDAP meeting (2/3)



Quasi global (55S-55n)
1°x1° / 1 day datasets
2001-2013

Rx1day (annual maximum at each grid point)
as a function
Of the total annual amount (at the grid point)

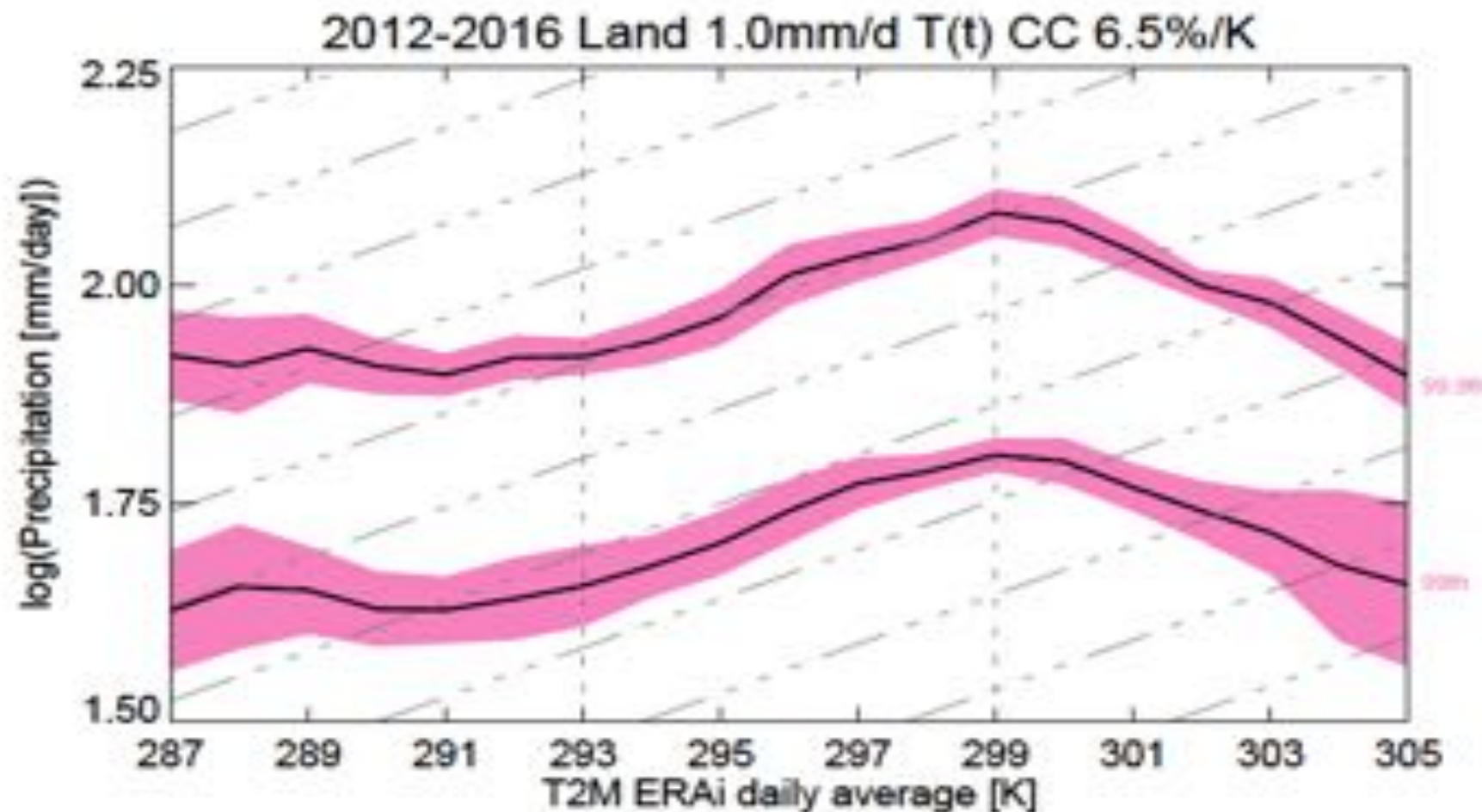
Courtesy: Margot Bador, ARC Extreme, UNSW

Joint GC Extremes and GDAP meeting (2/3)

$\{ \partial s / \partial p \downarrow \theta \uparrow^* \}$

$\partial P_e / P_e \propto \delta q \downarrow s \uparrow_{surface} / s \uparrow_{surface}$

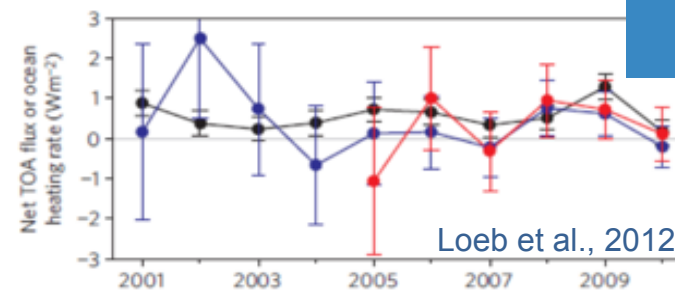
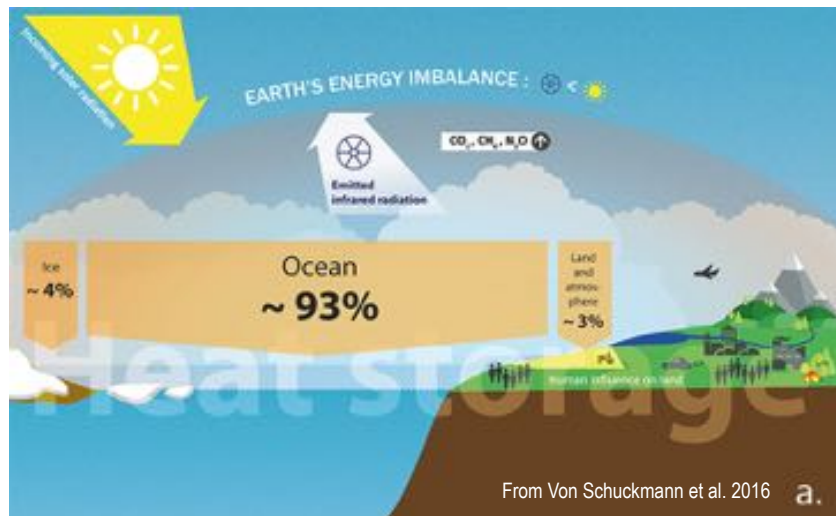
~6-7%/K



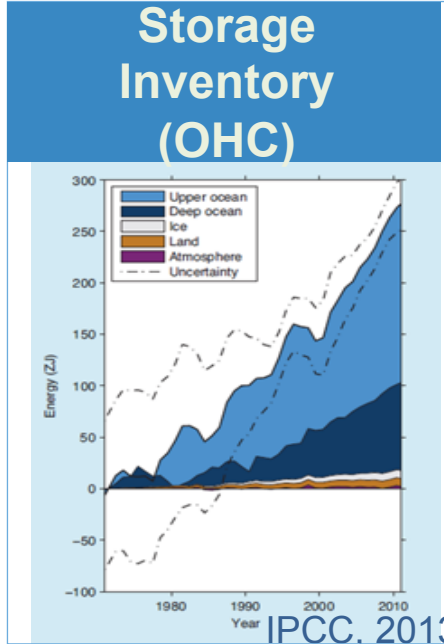
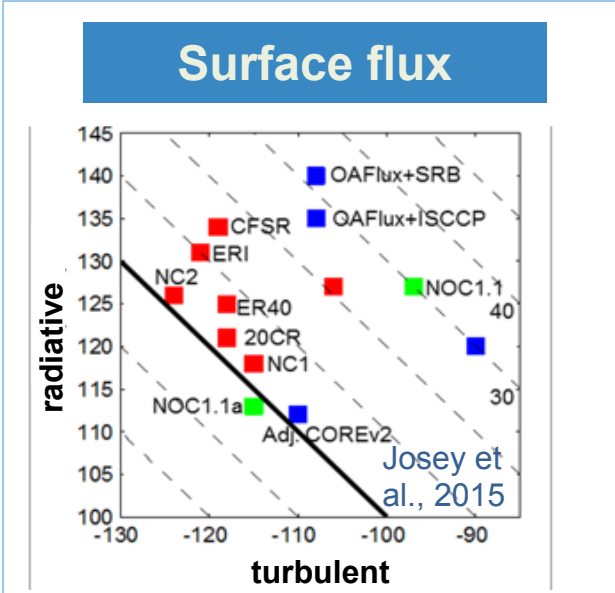
Ensemble of satellite precipitation data using the microwave constellation shows strong consistency with surf Temp confirms the theory for the tropics

WCRP/CLIVAR/GEWEX "EEI and its Implications" (1/3)

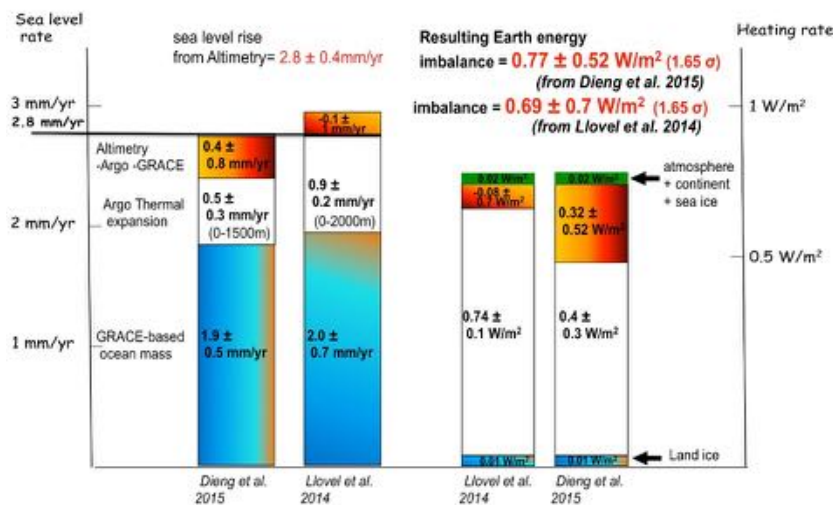
Radiation at TOA



Sea level budget



Sea level budget and Earth Energy imbalance : 2005-2013



WCRP/CLIVAR/GEWEX “EEI and its Implications” (2/3)

- **Seiji Kato** NASA Langley Research Center Contributions from Fred G. Rose, Norman G. Loeb, and John T. Fasullo

Satellite derived global annual mean energy fluxes

Flux ¹	Global mean (Wm ⁻²)	Source
Surface net shortwave	164	Ed4 EBAF
Surface net longwave	-54	Ed4 EBAF
Latent heat fluxes = Precipitation	-78	GPCP version 2.3
Sensible heat	-23	SeaFlux, Princeton ET
Sum	9	
Ocean heating rate	Less than 1	0.68 Wm ⁻² + 0.03 Wm ⁻² (ice warming and melt + etc.)
Energy flux associated with mass (water) transfer	Less than 1	0.8 Wm ⁻² over ocean

Enthalpy flux associated with the water mass flux (i.e. precipitation and evaporation) with new equations.

WCRP/CLIVAR/GEWEX “EEI and its Implications” (3/3)

R.Roca, K. Von Schuckmann + Help from T. L’Ecuyer, b. Meyssignac

Proposed by Rémy at GDAP 2017, Boulder

Goals and objectives of the workshop

The main objective of the workshop was to initiate a new WCRP-wide activity and to thus strengthen and extend the community on the Earth’s energy imbalance through a community wide discussion on links across all the WCRP Core Projects and relevant activities. The main goal was to identify research opportunities focused on the Earth’s energy imbalance, and synthesize the various aspects across WCRP, through:

The workshop took place over 3.5 days as an open event for all experts of related field on the Earth energy imbalance. A number of 75 experts have participated. The program had been organized under four sessions, which build on oral presentations (solicited & abstract submissions), posters and half-day working group activities under specified working topics to achieve the workshop goals. Those working groups had been animated by solicited working group chairs (Appendix. I).

Day 1 EEI: in-situ cannot provide interannual var; need for standards

Day 2: OH transport: links unclear to EEI issue

Day 3: Climate models and Ice: far from the data world and energy budget



Final report on the WCRP workshop
“The Earth’s Energy Imbalance and its implications”
13 – 16 November 2018, Toulouse, France

Sponsors:



Good participation of the GEWEX Scientists
A lot of discussions : weak consensus
A special collection in J Climate is in the preparation

One consensual and validated outcome
EEI assesment in GDAP (Meyssignac and Boyer)

GDAP Meeting outcome :general



2.5 days in Nov 2018 in Lisboa
Hosted by Isabel Trigo, IPMA

Two days : open
Half a day: panel members only

(re) Scoping of the panel activities and identity

Identity emerges: research panel, observations centric, climate-oriented, consistency-driven, global and worldwide

- More science focused; consequence for the assessments and all new activities
- Explore new members participation (oceanographer, geodesy, Vietnam, ...)
- New TOR for members (each one is a « co-chair »; each one in charge of overseeing/animating/reviewing a project)
- New format of the meeting in the future: 3.5 days (half a day for the panel affairs)
 - More science invited presentations , including agencies
 - Report from the related PROES
 - No more sponsorship of the data production -> integrated product
- Positioning with other bodies, like WMO/CGMS working group (cloud, surface, precip,..), WDAC, TIRA, GCOS (see last topic)

GDAP Meeting outcome: the integrated product (1/2)

Long time project

Not as integrated as initially planned

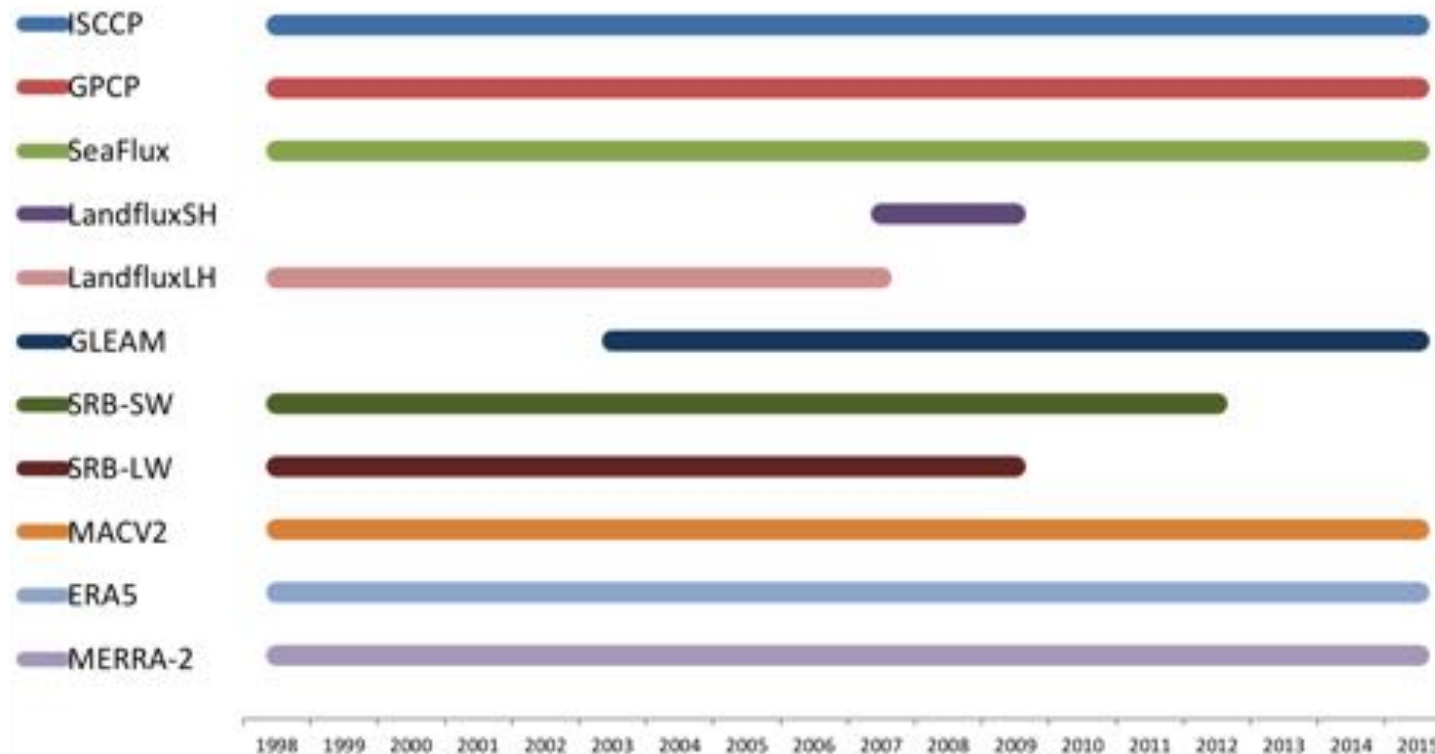
A lot of technical problems

Lead by C. Kummerow & P Brown
from CSU

With inputs from NCEI, P
Stackhouse, S. Kinne, B Alder, etc...

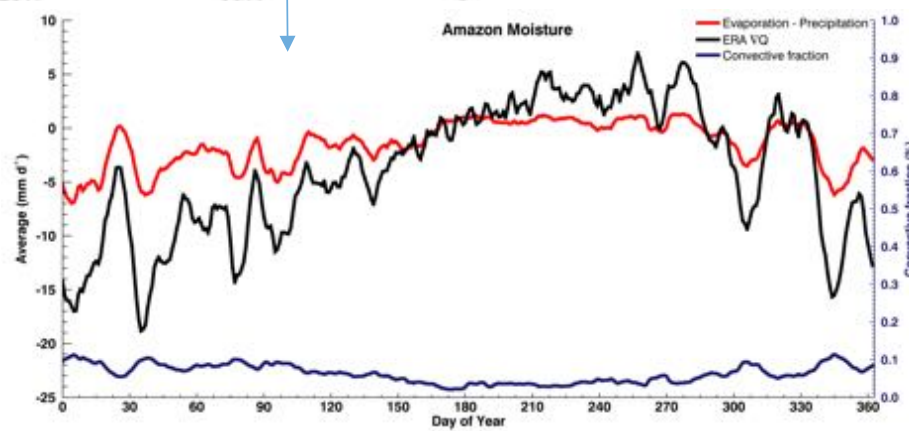
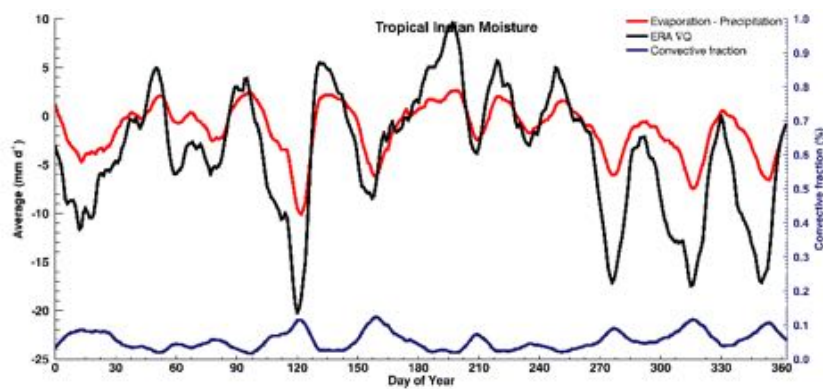
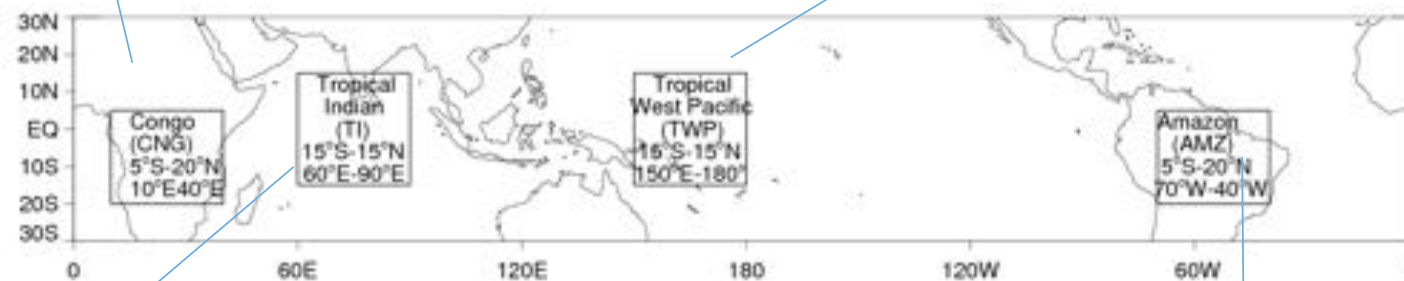
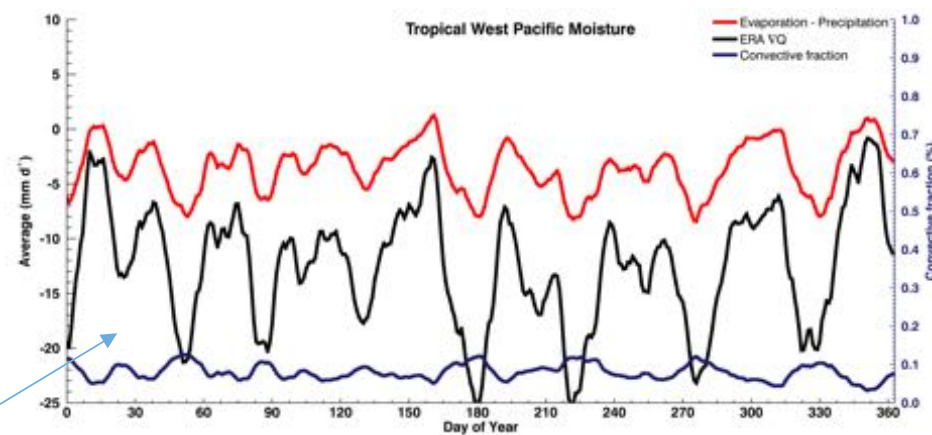
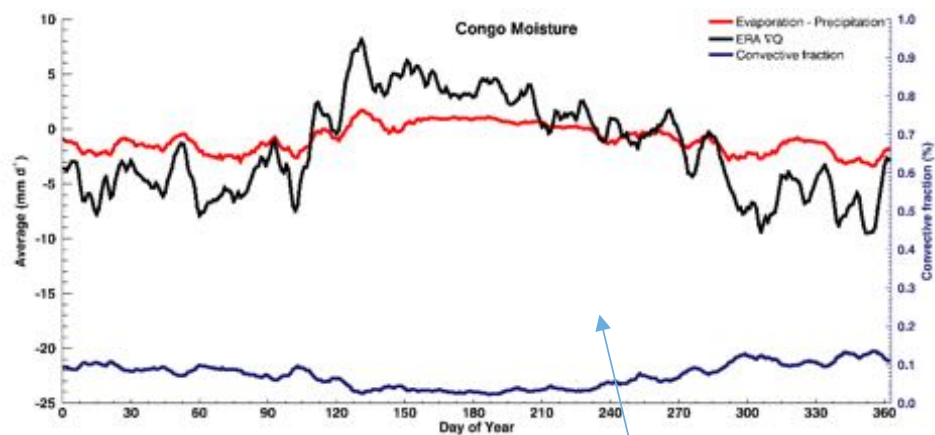
Yet a dataset with multiple sources that do provide a global water and energy « observational » perspective at the $1^\circ \times 1^\circ$ 3 hourly resolution over 15 years +

ftp://rain.atmos.colostate.edu/pub/pbrown/GEWEX_IP_2019.



ERA5 Still running

GDAP Meeting outcome: the integrated product (2/2) 2002



Courtesy P. Brown, CSU

GDAP Meeting summary : scope of assessment

- New paradigm for assessment:
 - Assessments are meant to address science questions, particularly those related to climate.
 - They should be driven by underlying science questions **not just assessments for the sake of comparing data products**.
- A **focus on process** (for all assessments) aligns particularly well with new WCRP foci and GEWEX activities
- Should discuss **cross-cutting assessment activities** that address PROES
 - An example could concern connecting the trend in deep convective clouds (IR TB < 195 K) to the trend in area of high water vapor concentration
 - Such multi-parameter assessments better connect to processes and build upon existing assessments without being repetitive
- Assessments should **inform users, provide feedback to data producers, and provide guidance/make informed recommendations for future missions**
- Assessments must also **understand the cause of uncertainties** – goal is to be able to predict uncertainties in regions where you don't have in situ observations
- Ease** the access to the data (cloud, water vapor and precip)

GDAP Meeting outcome: assessments

Status of the assessments

Aerosols **CANCELED**

No response from the leads; more than 10 years old; obsolete

Clouds (lead: C. Stubenrauch) **ENDED**

Update to the database+ short paper to describe the updates

Next assessment in a few years

Water vapor (Lead: M. Schroder) **RENEWED**

Phase 1 report and papers published

Phase 2 has been approved and is on going

Precipitation (Lead: H Masunaga) **MERGED** with IPWG assessment

Good progress; publications in the pipe; participation to the July event on extremes

New agreed assessments

Soil moisture (lead: W. Rodigo) -> detail to be implemented in lines with the new paradigm

Aerosols (lead to be identified if we keep it) -> support to ACCP effort

EEI (leads B meyssignac and T Boyer) already funded thanks to WCRP (15kE) **overseen by S. Kato**

GDAP Meeting summary: surface networks

BSRN (radiation)

New director **Christian LANCONELLI**

Looking for a Deputy director

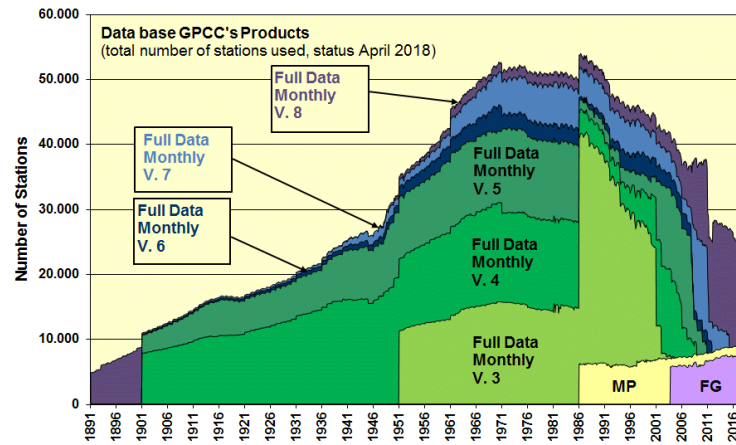
15th BSRN Scientific Review Workshop
16-20 July 2018, Boulder, Colorado, USA

76 scientists, station managers, and data users from 24 countries representing 49 different organizations presented 37 talks and 31 posters!



<http://www.gewex.org/resources/gewex-news/>
https://www.wcrp-climate.org/WCRP_Reports/2018/WCRP_Report_20_2018_15th_BSRN_Meeting_Report.pdf

GPCC (Precipitation) New product: involved in the assessment

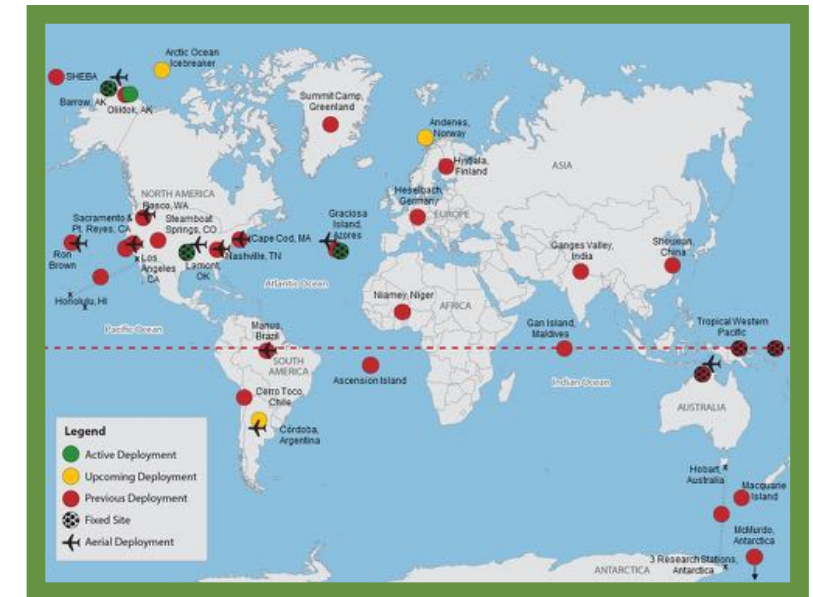


IWSM (Soil Moisture)

involved in the design of the land flux new activity

ARM (everything)

involved in the design of the land flux new activity



GDAP Meeting summary :the land flux spin up activity

“Towards consistency of land surface - atmosphere interactions from global Earth observations”

"The workshop seeks to better understand the benefits and limitations of the newly released GEWEX Global, 1 degree, 3-hourly Integrated Water and Energy products for use in understanding land surface - atmosphere interactions. The workshop will focus on both land surface properties and radiation measurements and their consistency with reported turbulent fluxes, as well as the turbulent fluxes, and their consistency with boundary layer structure and convective cloud structures. Talks are invited that report on this consistency both from the global satellite perspective, as well as existing ground based measurement sites such as ARM that can shed additional light on critical processes that at a local scale that the satellite should capture in order to help guide numerical model formulation and validation”



Location: Toledo, Spain

Dates: Fall 2019. Exact dates TBD

Organisation team: C. Kummerow, I. Trigo, W. Dorigo, T. L'Ecuyer & J. Mather

GDAP Meeting summary :the ISSCP Next Gen

- Cloud properties constitute a core geophysical climate record
- Instruments and expertise exist to generate a calibrated, global, 10-channel, multi-parameter cloud at 3 km with 30 minute coverage
 - Heritage to deal with such data volumes also exists (e.g. AIRS and MODIS)
- Excellent opportunity for coordinated NASA and NOAA activity to maximize scientific benefits of new geostationary and low-earth orbiting satellites
- GDAP endorses the formation of a team to develop a unified analysis approach built around the current geostationary radiance data record augmented by MODIS/VIIRS and sounder cloud information
 - Agency support for a series of international workshops
 - Target 2021 for initial implementation
- A multi-institutional (multi-national) processing chain similar to ISCCP is encouraged
 - Individual satellite operators, collect, quality control, and sub-sample radiances and provide these data to an analysis center that would conduct a refined calibration and the quantitative cloud analysis.
 - Data products to be archived and distributed by existing data centers.

Andy Heidenger is in charge of setting up a small scoping workshop

2019 Spring/summer at EUMETSAT

Support from NASA via Graeme & GEWEX (?)

Workshop announcement almost finished