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Fiduceo

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ASSIMILA

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DLR

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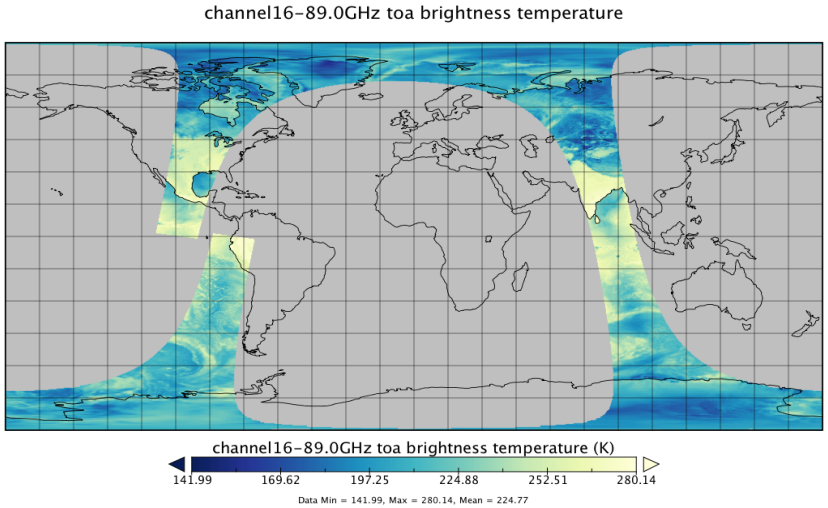
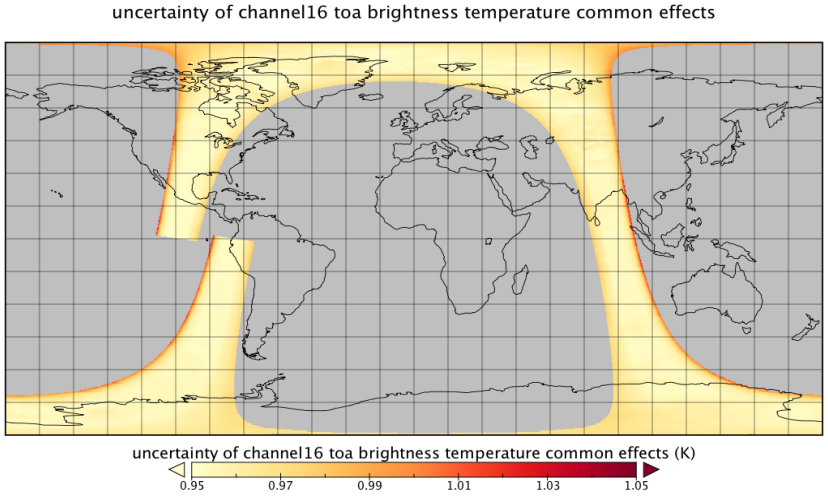
OVERVIEW OF WORK DONE

FEATURES OF FIDUCEO FCDR & EXAMPLE CONTENTS

- Data format: NetCDF
  - Easy to use
  - Attributes explaining the content of the variables
- Data arrangement: Equator – to – Equator
- On Pixel-level:
  - Brightness temperatures for all 5 channels
  - Uncertainties due to independent effects
  - Uncertainties due to structured effects
  - Uncertainties due to common effects
  - Quality information
- Information on transmitter status in bitmask for scan line quality (helpful for RFI related issues)
- Per scan line: original scan line number and file (level1b)





AAPD Errors Corrected

Existing Level 1c Data

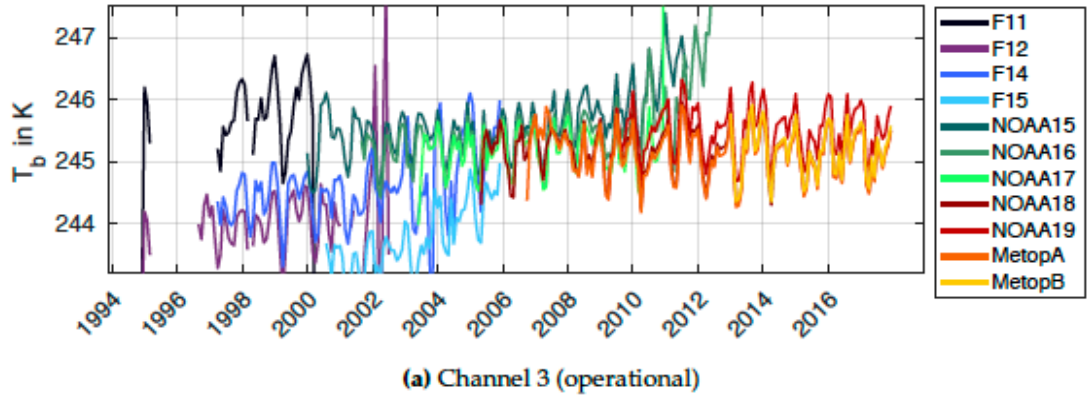
- Outdated natural constants
- Too small angular threshold for Moon intrusion
- Arbitrary weights of PRTs
- Band correction the same for IWCT and DSV
- Wrong APC for AMSU-B (ch. 4, 5) and MHS on NOAA-18
- RFI correction N15/17 only

Fiduceo Easy FCDR

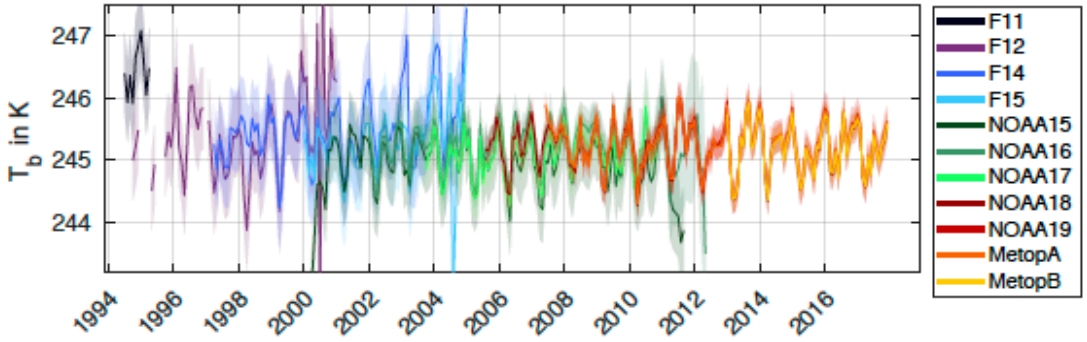
- Correct natural constants
- Correct identification of Moon in DSV
- Good PRT no. 6 included
- Different band corrections for IWCT and DSV
- Appropriate antenna pattern correction
- RFI correction also N16/19

MAJOR ACHIEVEMENTS

Comparison of the Time Series of T_B in Channel 3



(a) Channel 3 (operational)



(b) Channel 3 (FCDR)

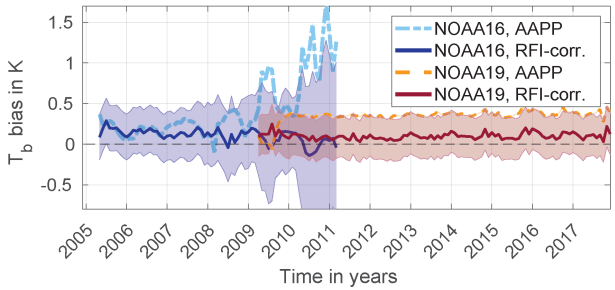
- The FCDR from FIDUCEO provides more consistent and stable time series
- The shaded regions denote the uncertainty due to common effects for FIDUCEO
- There is no uncertainty estimate on pixel level for the products of AAPP

PROBLEMS ENCOUNTERED AND SOLUTIONS

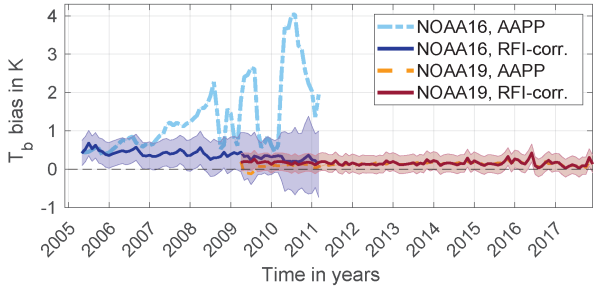
RFI Correction Removes Inter-Satellite Biases

Biases in Channels 3-5

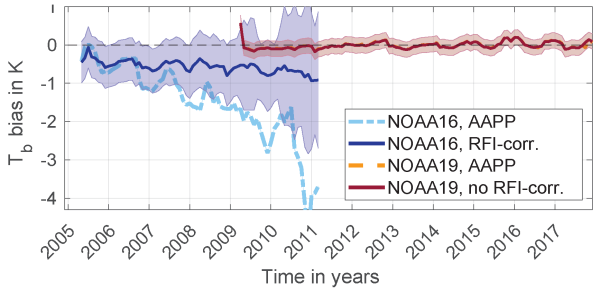
- Problem: significant biases with AMSU-B on N-16 and MHS on N-19
- Observation: receiver gains have fallen with N-16
- Standard correction: Monthly intercalibration coefficients
- FIDUCEO correction: FOV-specific values added to Earth counts
- Remaining biases up to five times smaller with FIDUCEO



(a)



(b)



(c)

DELIVERABLES AND MILESTONES

Deliverables

- Radiances for all channels of eleven different MW humidity sounders
- Consistent calibration model for whole series
- Known issues taken into account
- Harmonized measurement equation parameters
- Quick start and user guide
- Metrological assessment
- Scientific basis

Delivered

- Full measurement equation
- … and previously unknown features as well
- Not feasible by Feb 2019
- Complete documentation incl. several publications in refereed journals

RECOMMENDATIONS FOR FUTURE

Pros and Cons of Harmonization

Questions Concerning Harmonization

- What are the uncertainties of the biases?
- How to calculate biases (NCT, DDs over O-B, SNO, OCTM)?
- Does a harmonization based on SNO reduce all biases?
- Is MHS on NOAA-18 a good reference instrument?
- Are comparisons among similar instruments good checks of their stability?
- Is it possible to establish an absolute flux reference that is observed by every sounder times per year during the whole mission?