WP3 Review

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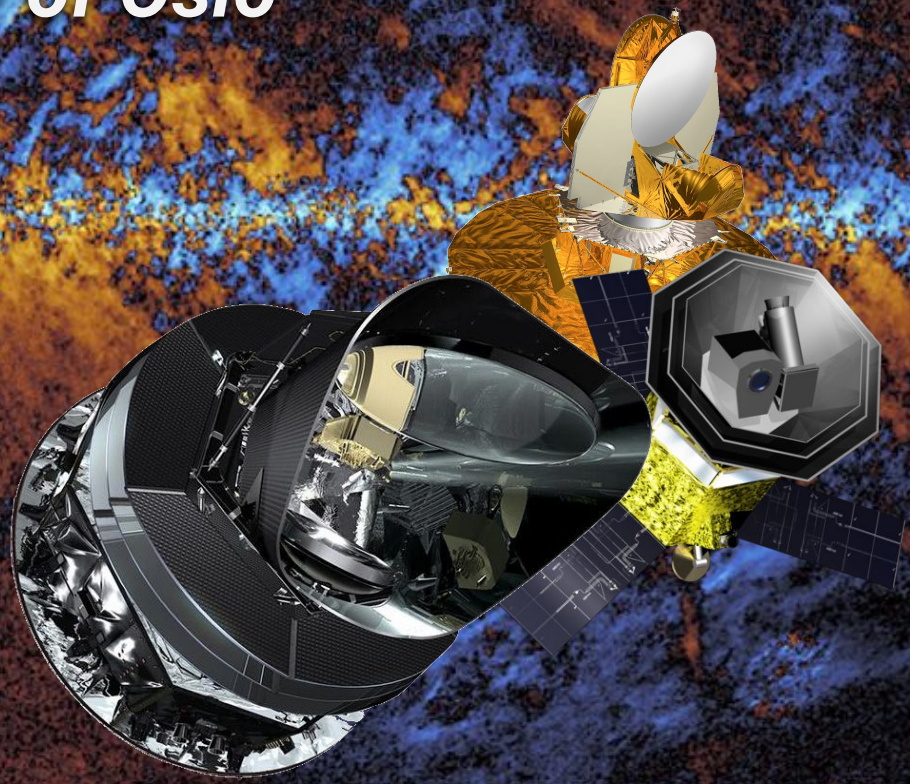


BeyondPlanck final review, December 15, 2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776282

WP3

- Original purpose: Providing a module that would convert time-ordered voltages into time-ordered thermodynamic temperatures, with all known systematics removed, and to integrate this module into the surrounding pipeline.

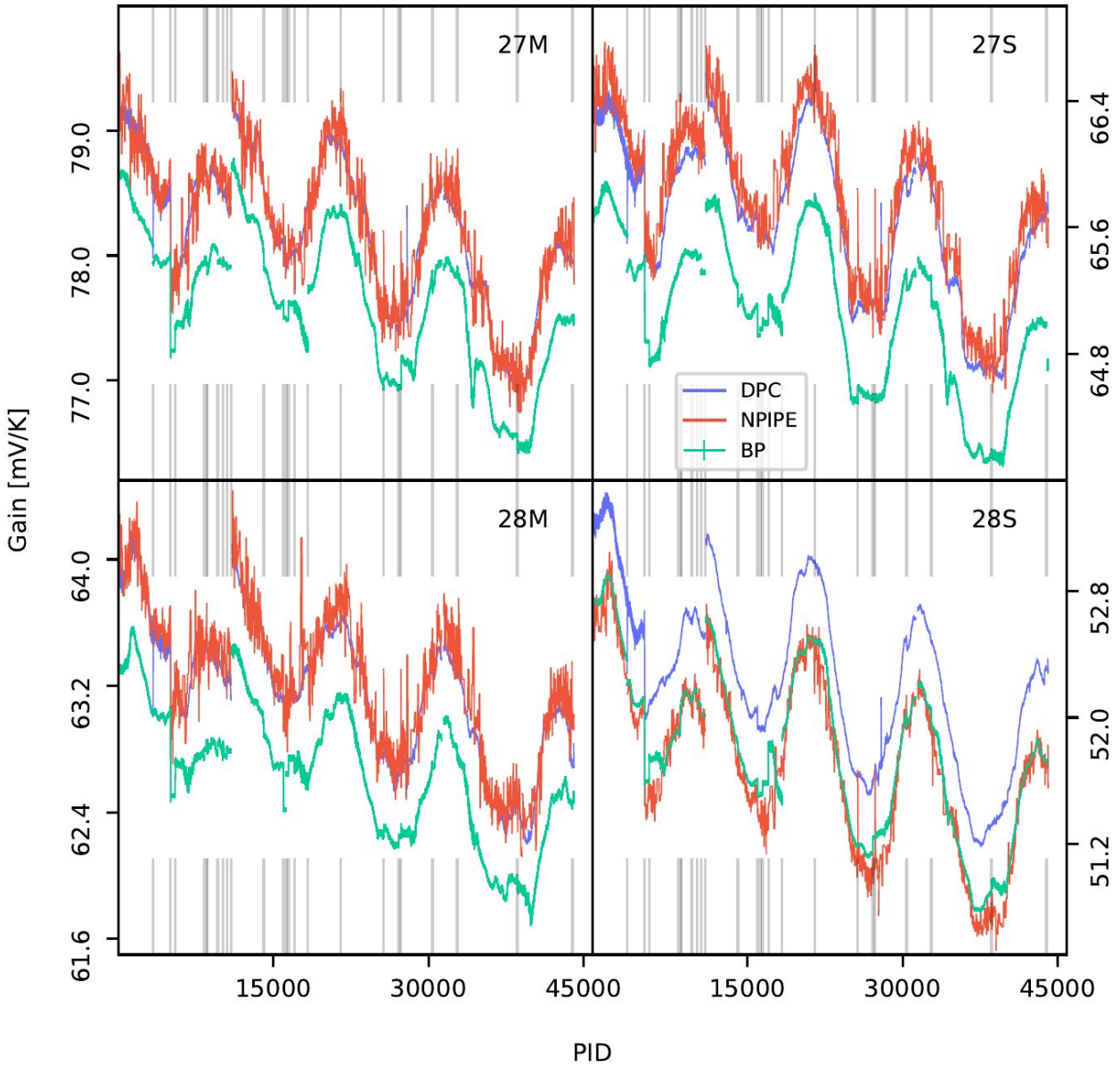
Two deliverables:

- Prototype gain estimation module and calibrated timeline, to be delivered in month 9.
  - Delivered 1 Dec, 2018, and approved.
- Full pipeline and final calibrated timelines, to be delivered in month 12.
  - Delivered 12 March 2019, and approved.

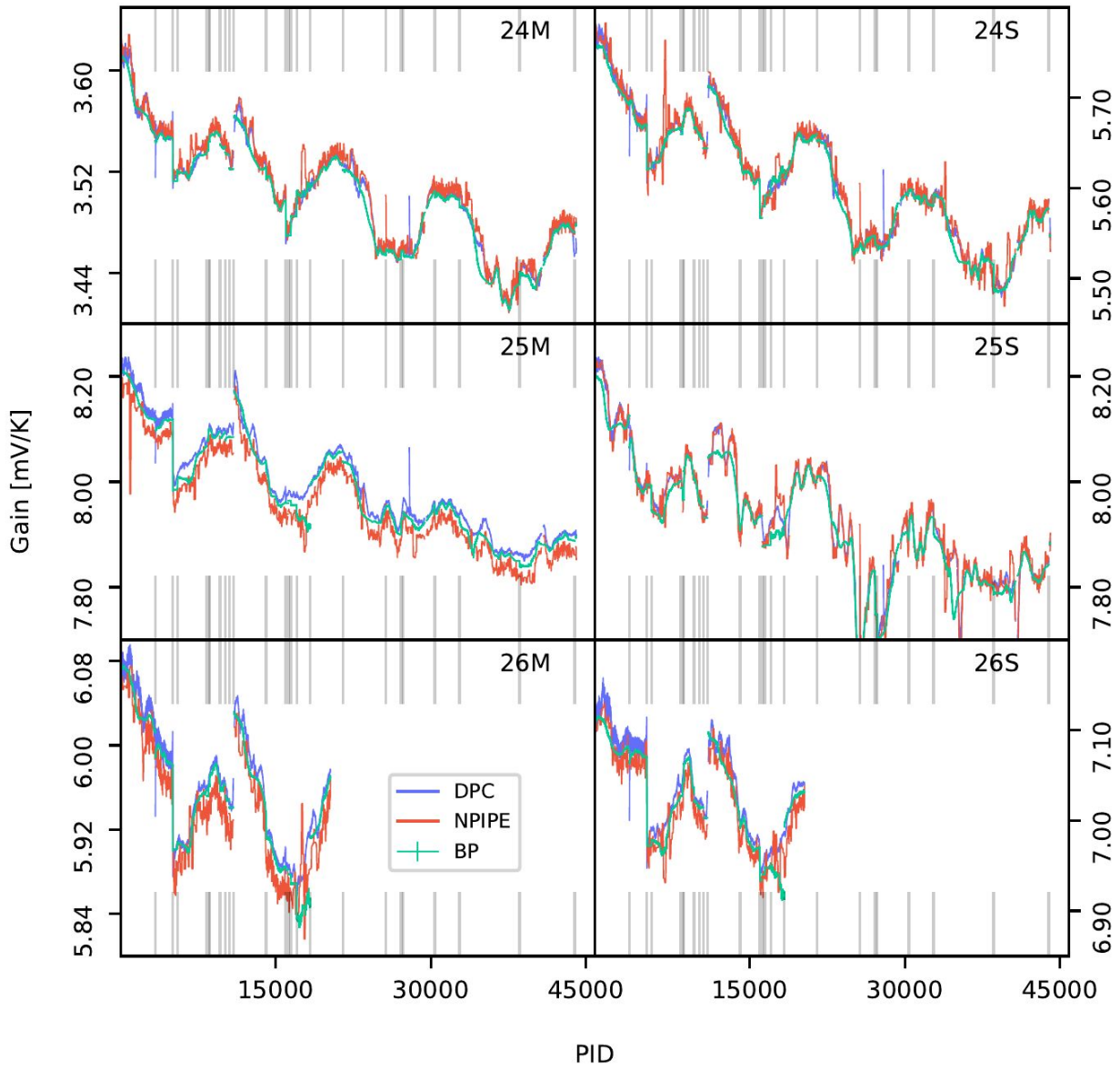
Methodology

- As part of a larger integration of all parts of the pipeline into Commander3, the gain module was also integrated.
- The initial gain model allowed for significant dipole leakage to polarization because of between-detector mismatch.
- Led to current gain model: $g_{q,i} = g_0 + \Delta g_i + \delta g_{q,i}$
- Absolute gain sampled with orbital dipole, relative gains sampled using total sky signal of current iteration.
- Subsequent smoothing of the time-variable gain, using variable-width smoothing windows.

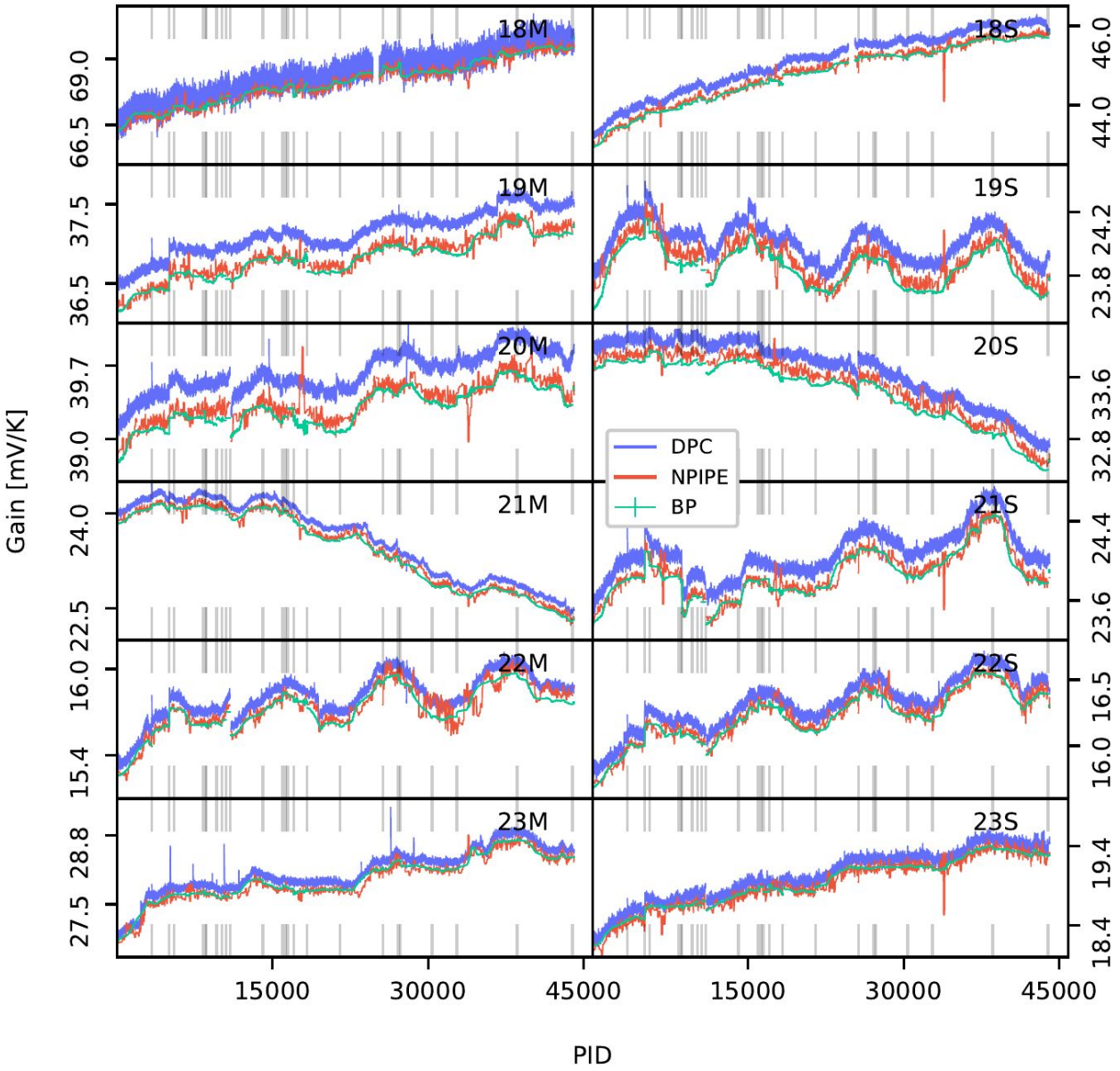
Final gain solutions



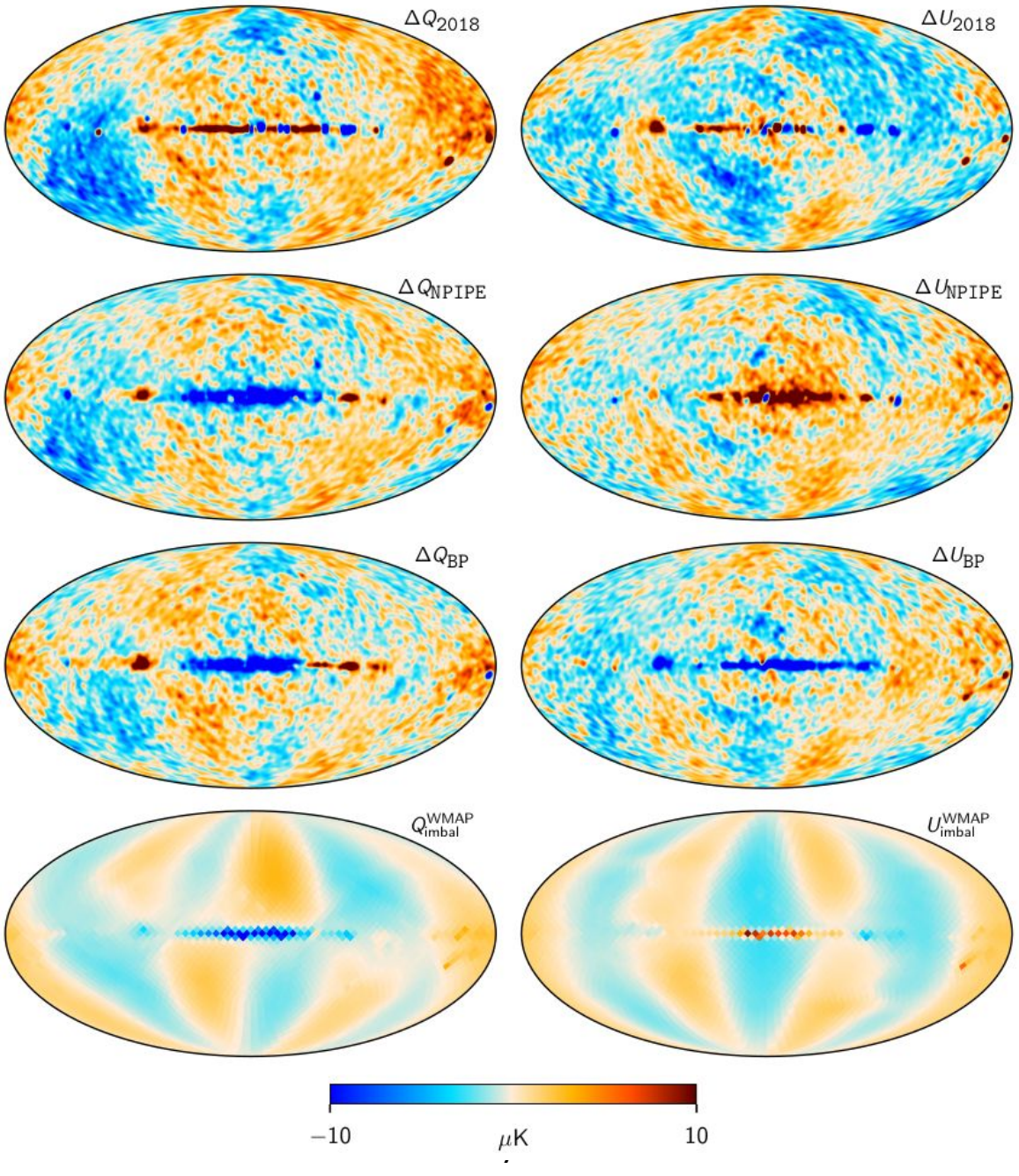
Final gain solutions



Final gain solutions



Solution consistency and improvement



Summary and outlook

- Original goal - creating a calibration module which takes into account all systematic effects, and integrate it into the surrounding pipeline - has been reached.
- With BeyondPlanck, calibration has for the first time been performed fully and iteratively within a global model of the sky and instrument.
- In the future, combining ‘orthogonal’ datasets shows potential for getting rid of a big part of gain systematics.
- Accurate calibration vital for next-generation experiments.

WP3 time reporting

Institution	EU	In kind
INAF	17.01	3.41
Oslo	1	0
Total	18.01	3.41
Budgeted	18.00	0
Deviation	0.01	3.41

The BeyondPlanck collaboration

EU-funded institutions

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Funding

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- "*BeyondPlanck*"
  - COMPET-4 program
  - PI: Hans Kristian Eriksen
  - Grant no.: 776282
  - Period: Mar 2018 to Nov 2020

Collaborating projects:

- "*bits2cosmology*"
  - ERC Consolidator Grant
  - PI: Hans Kristian Eriksen
  - Grant no: 772 253
  - Period: April 2018 to March 2023
- "*Cosmoglobe*"
  - ERC Consolidator Grant
  - PI: Ingunn Wehus
  - Grant no: 819 478
  - Period: June 2019 to May 2024

Questions?

Beyond PLANCK

Commander

Cosmoglobe