Figures for *Planck* papers

Examples and scripts

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ABSTRACT

Sample scripts are available that demonstrate how to produce figures compliant with the *Planck* Style Guide in PGPLOT, IDL, and Python.

Key words. cosmic microwave background – Instrumentation: polarimeters – Methods: data analysis

1. Introduction

Section 16 of the *Planck* Style Guide gives general guidelines for figures in *Planck* papers. Unfortunately, the default settings of standard plotting packages do not produce figures compliant with these guidelines. To help in the production of compliant figures, we have developed scripts that drive PGPLOT, IDL, and Python appropriately and can be adapted to the specific figures in *Planck* papers. These scripts and the figure files that they produce are available at

<http://github.com/zonca/paperplots/>

There is no text and therefore a lot of white space on many of the following pages. We include

```
\clearpage
```

after each set of figures to force them onto the page rather than let LaTeX decide how to rearrange them for more "optimum" placement.

2. Line plots

The most common type of figure is the line plot. Plots of the same data are shown below made by PGPlot, IDL, and Python.
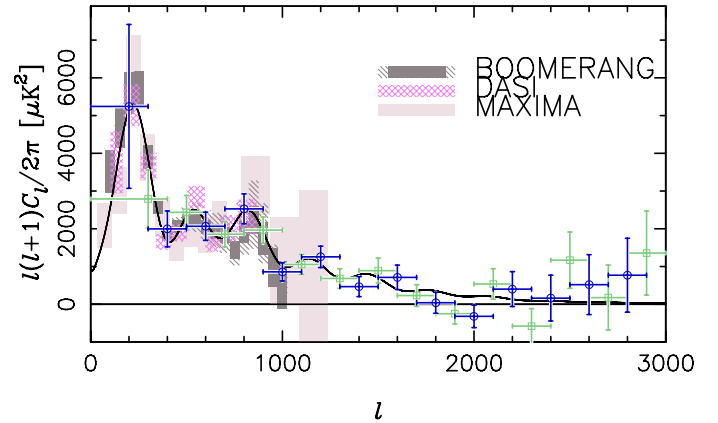
2.1. PGPlot

Figures 1–3 show the same data plotted by PGPlot for the three sizes of figure that A&A uses, single-column (88 mm), side-caption (120 mm), and two-column (180 mm). In each case, adjustments are made so that the letters, numbers, and characters in the axis labels remain 1.9–2.0 mm in height.

The required LaTeX commands are

```
\begin{figure} % Single-column figure
  \includegraphics[width=\hsize]{f13.eps}
  \caption{\fcaption}
  \label{line_pgplot88}
\end{figure}

\begin{figure*} % Figure with side caption
  \sidecaption
  \includegraphics[width=12cm]{f13.eps}
```
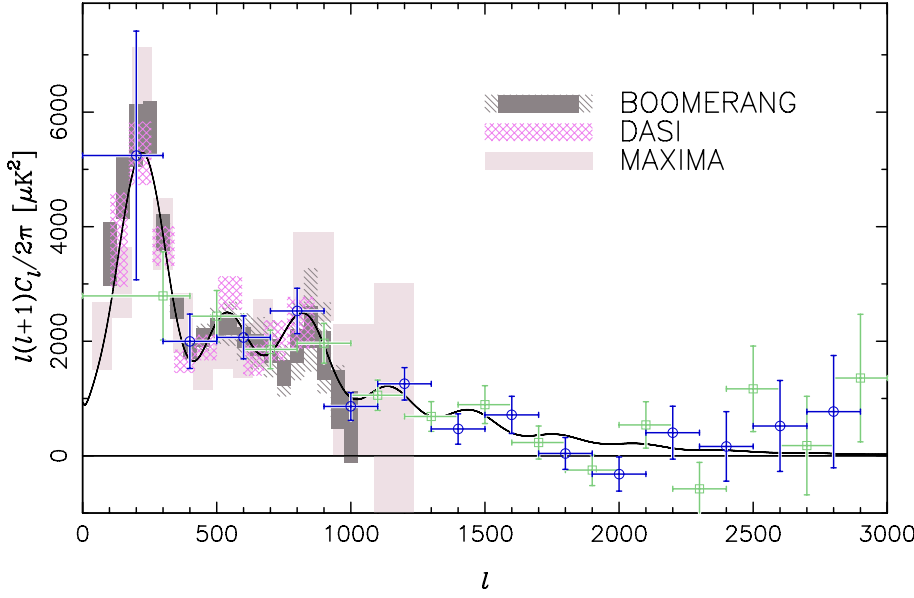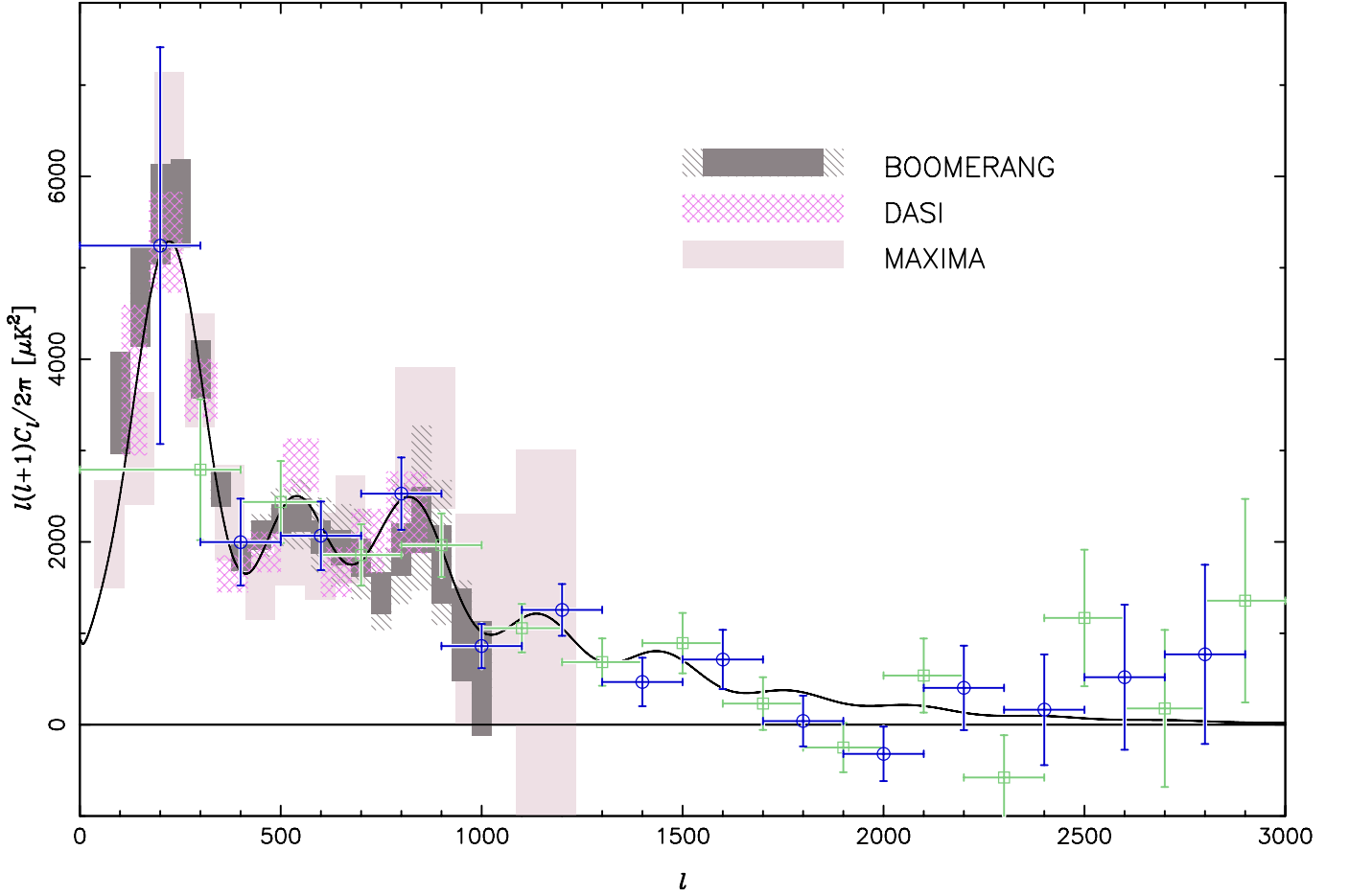

Fig. 1. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth (12.9 ± 1.4) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

```
  \caption{\fcaption}
  \label{line_pgplot120}
\end{figure*}

\begin{figure*} % Two-column figure
  \includegraphics[width=17cm]{f13.eps}
  \caption{line_pgplot180}
  \label{fig2col}
\end{figure*}
```
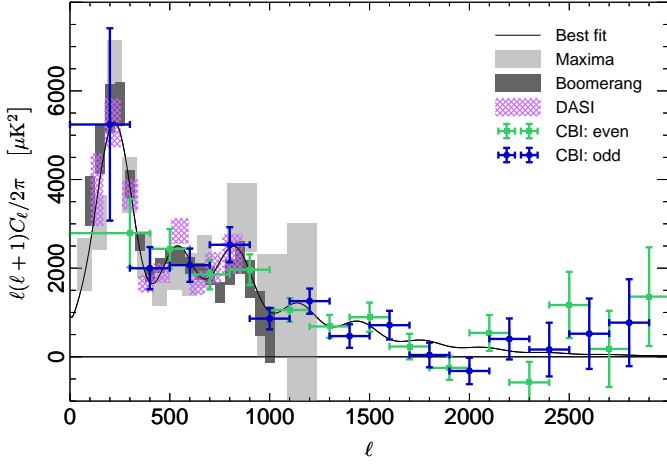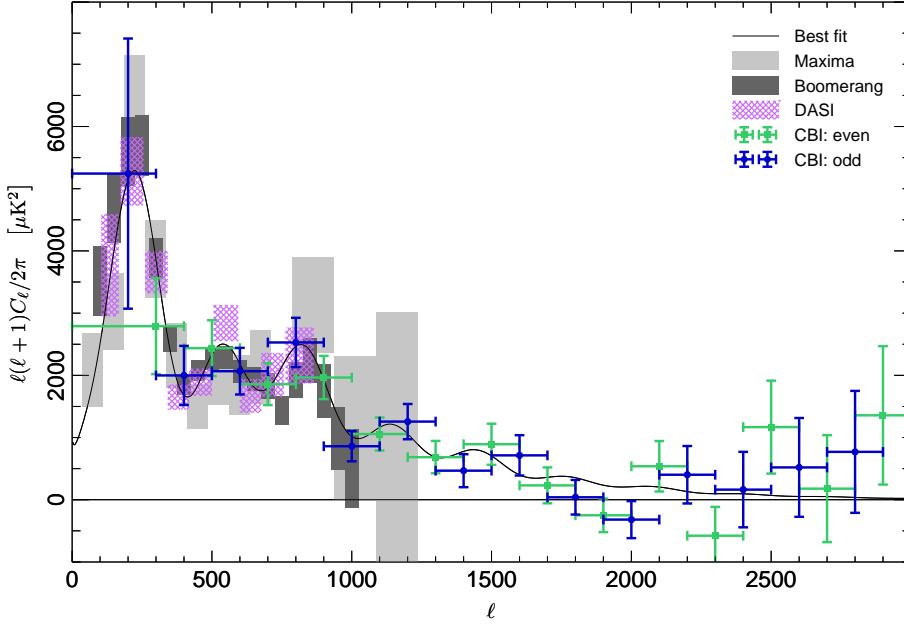
Fig. 2. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12\!\!.\!9 \pm 1\!\!.\!4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 3. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12\!\!.\!9 \pm 1\!\!.\!4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).
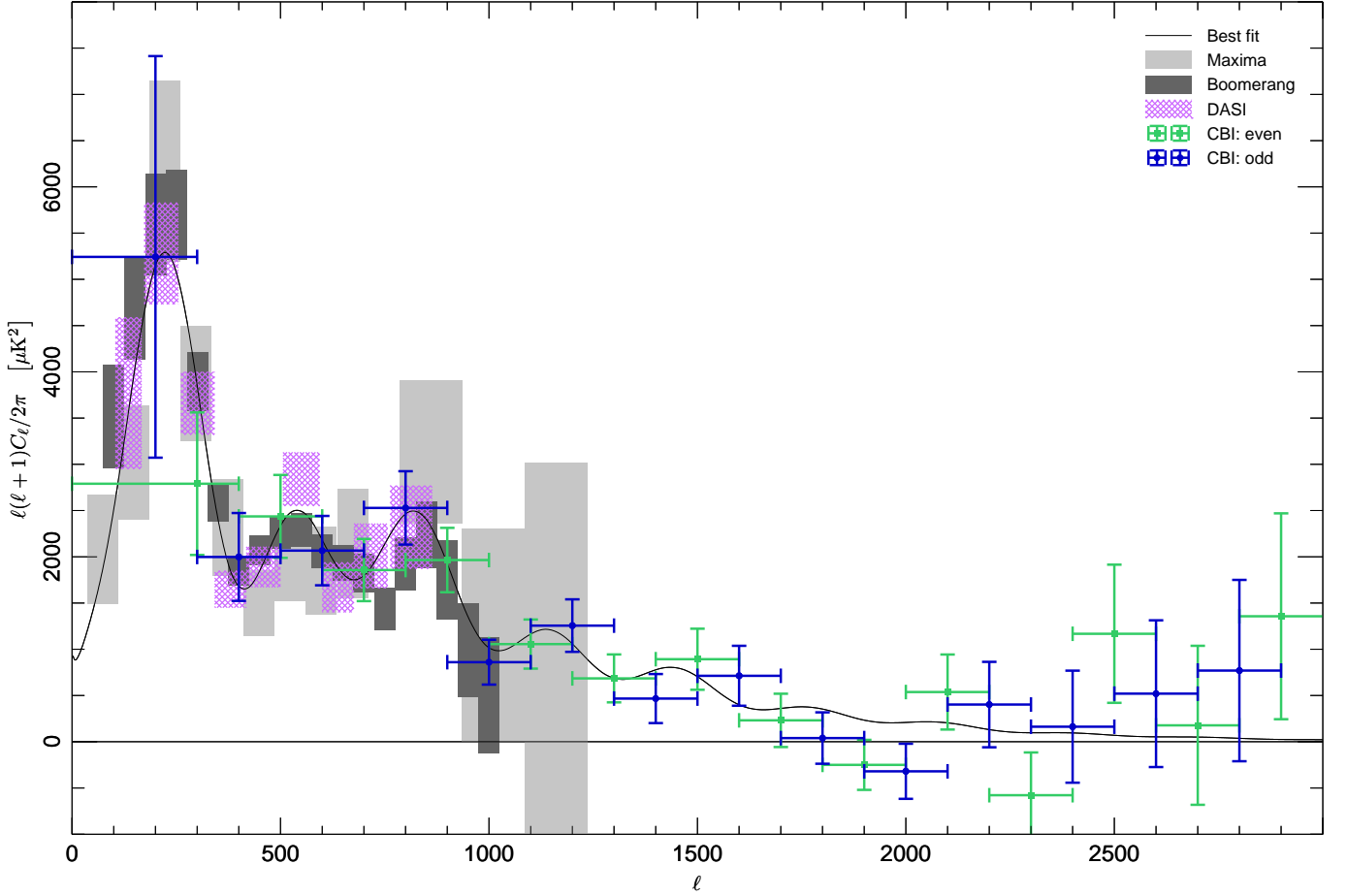
2.2. IDL

The three equivalent figures as produced by IDL are shown in Figs. 4–6.
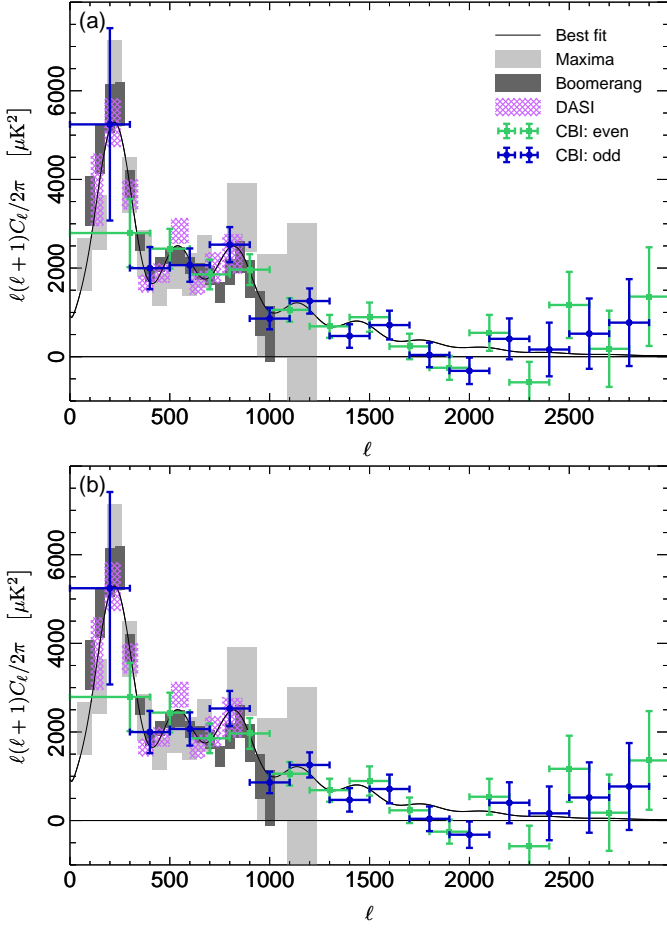

Fig. 4. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12'9 \pm 1'4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).
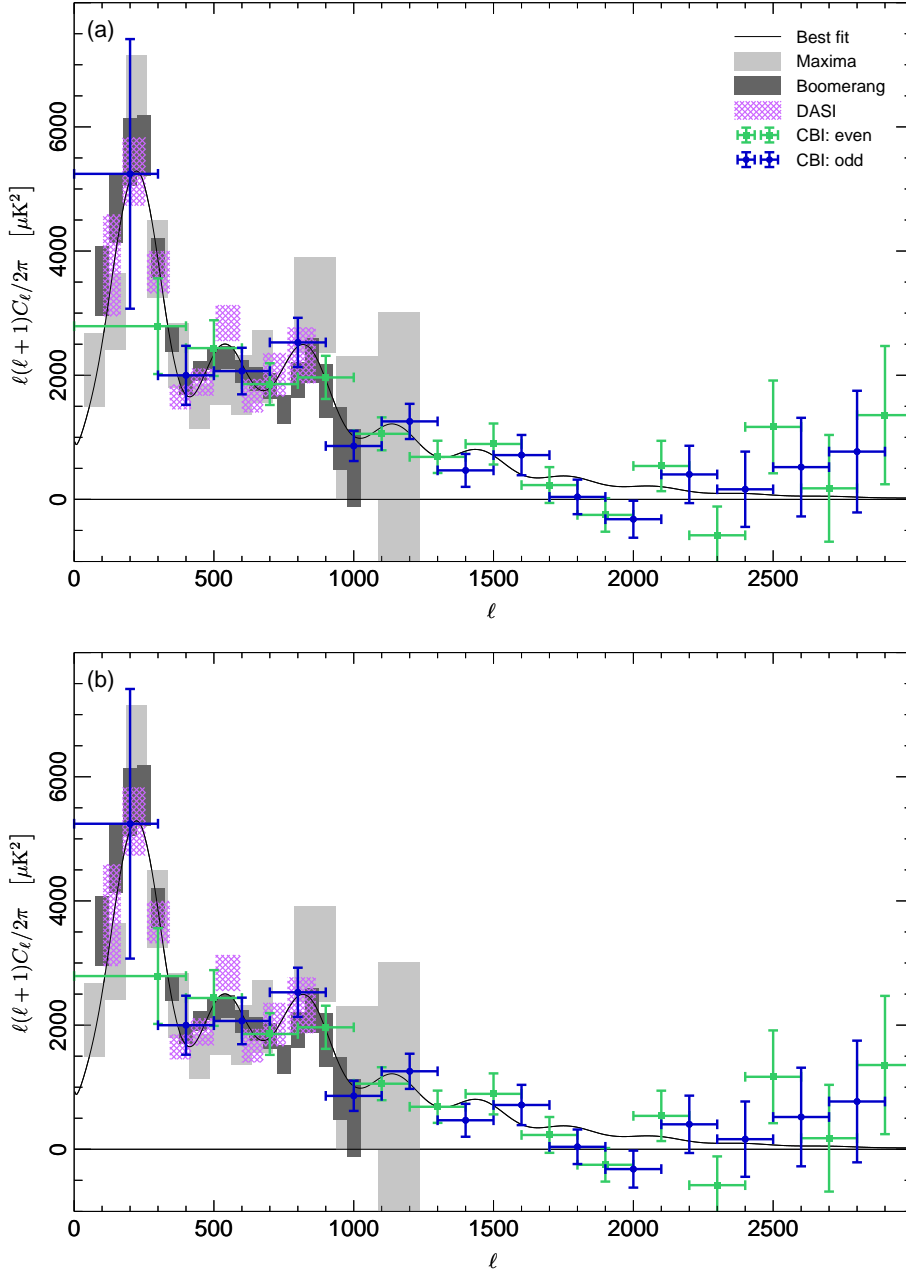
Fig. 5. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12.'9 \pm 1.'4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 6. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12.'9 \pm 1.'4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).
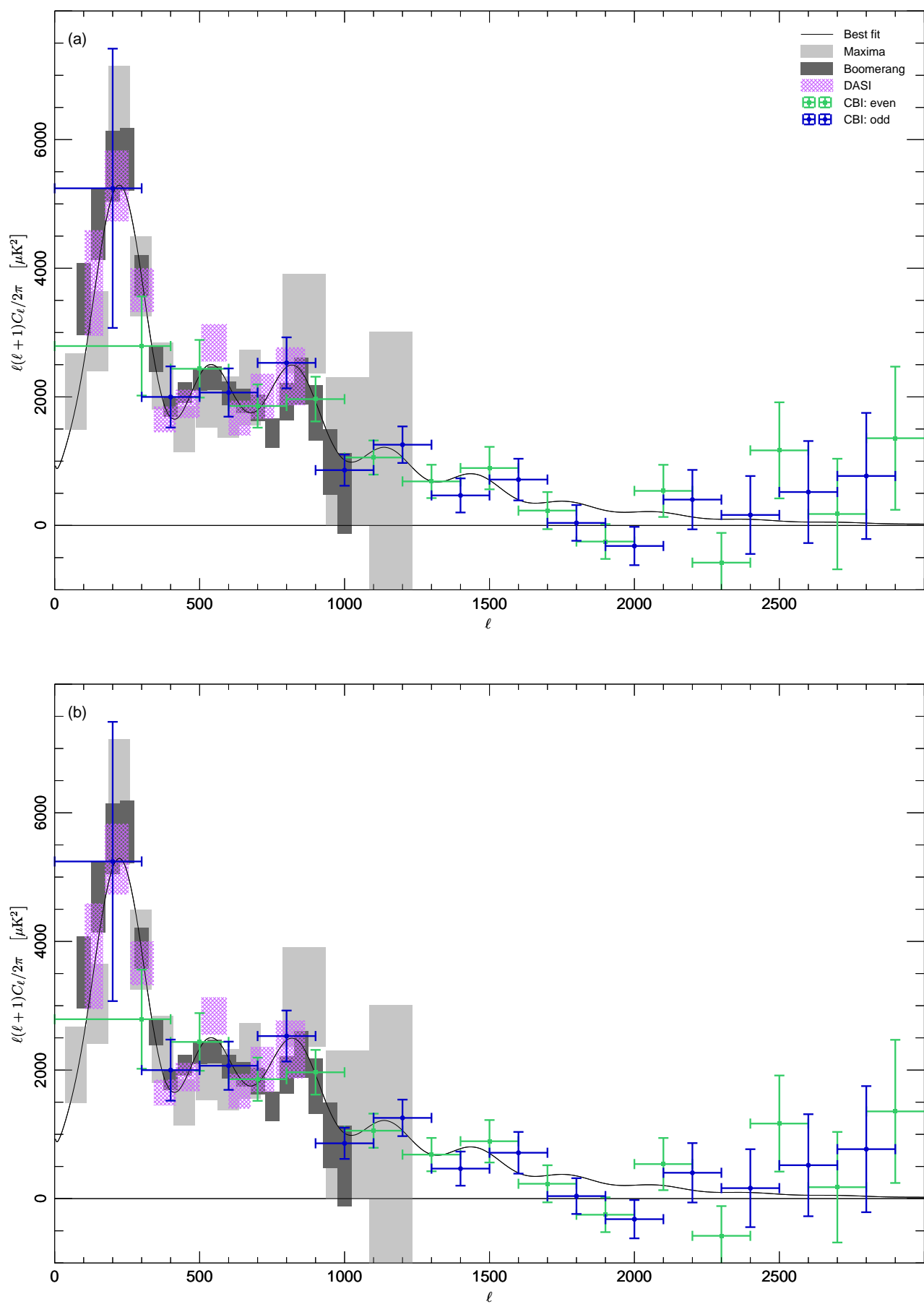
IDL scripts are also given for two-panel (top, bottom) figures. Here's what they look like.
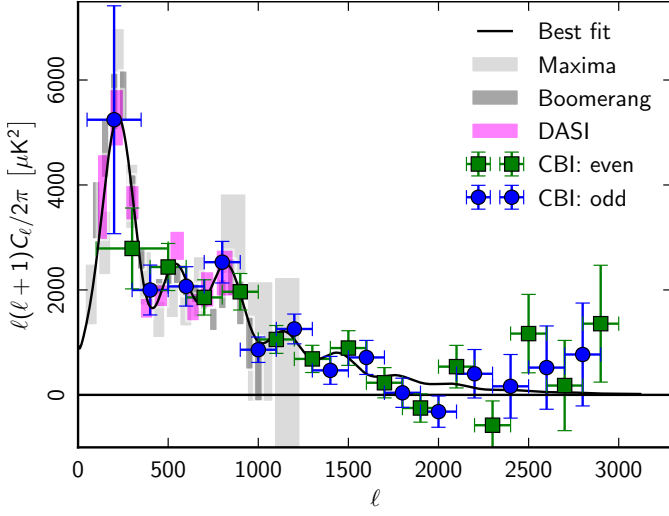

Fig. 7. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12\rlap{.}'9 \pm 1\rlap{.}'4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 8. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth (12.'9 $\pm$ 1.'4) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 9. This two-panel figure is taller than the A&A page when the width is set to 180 mm. The width has been reduced so that it fits.
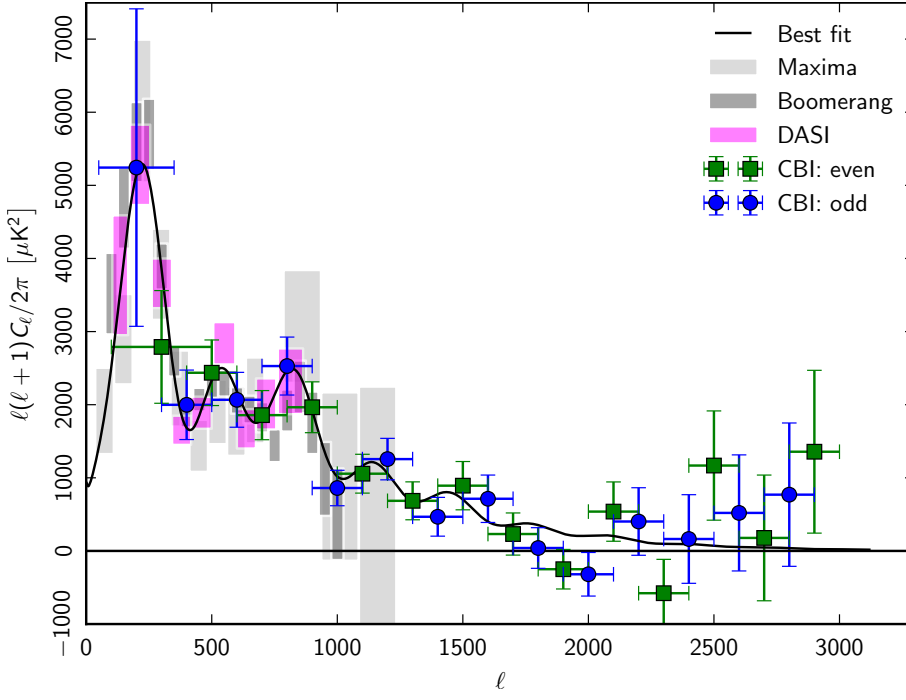
2.3. Python

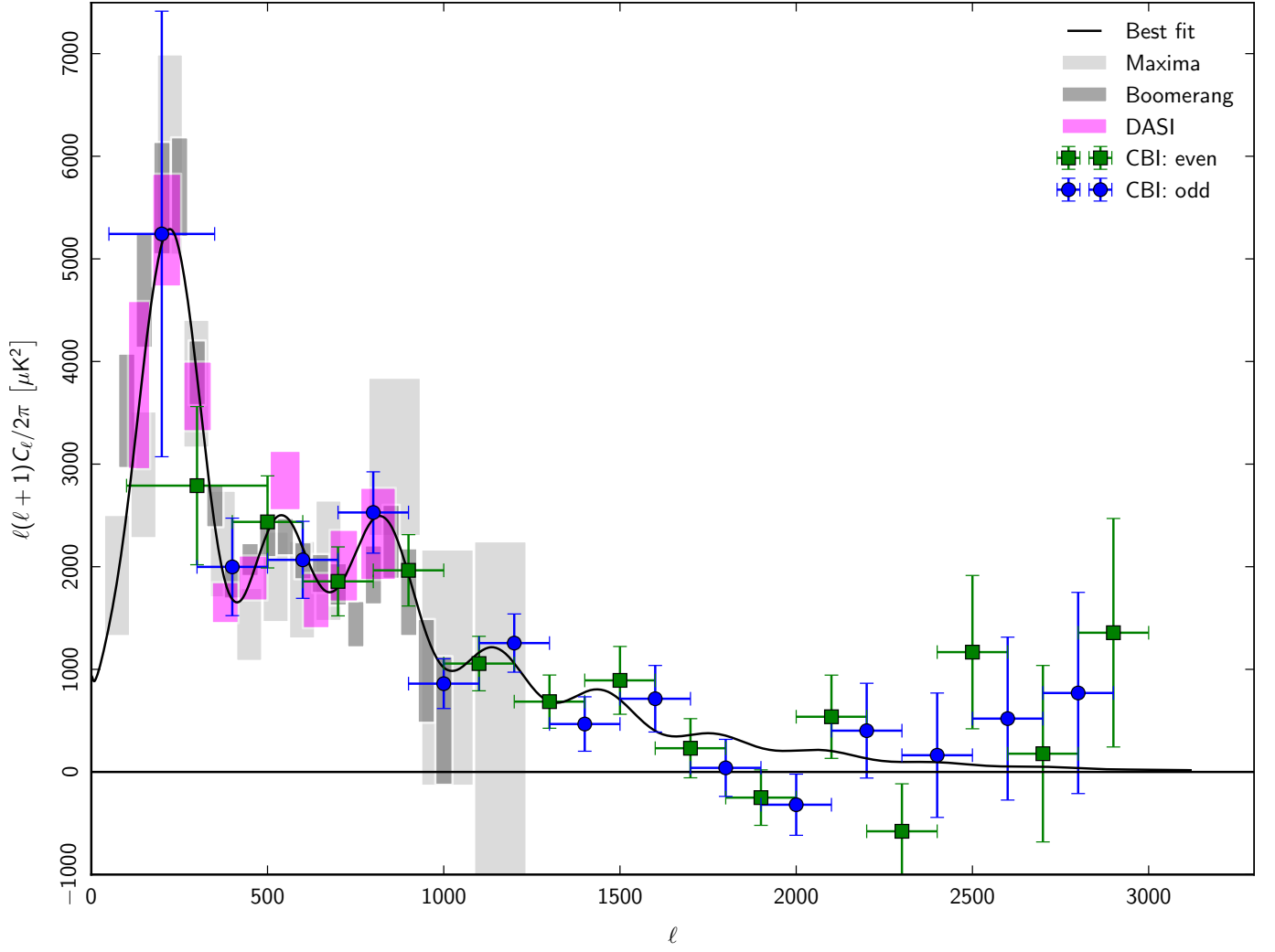The three equivalent figures as produced by Python are shown in Figs. 7–9.

Fig. 10. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12\!'\!.9 \pm 1\!'\!.4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 11. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12\rlap{.}'9 \pm 1\rlap{.}'4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

Fig. 12. Comparison of the joint power spectrum estimates from the three CBI mosaics with the measurements from BOOMERANG, DASI, and MAXIMA. The rectangles indicate the 68% confidence intervals on band-power; for BOOMERANG, the solid rectangles indicate the 68% confidence interval for the statistical and sample variance errors, while the hatched rectangles shows the amount by which a $\pm 1\sigma$ error in the beamwidth ($12'\!.9 \pm 1'\!.4$) would shift the estimates (all up or all down together). The *black curve* is the joint model (see text).

3. Maps

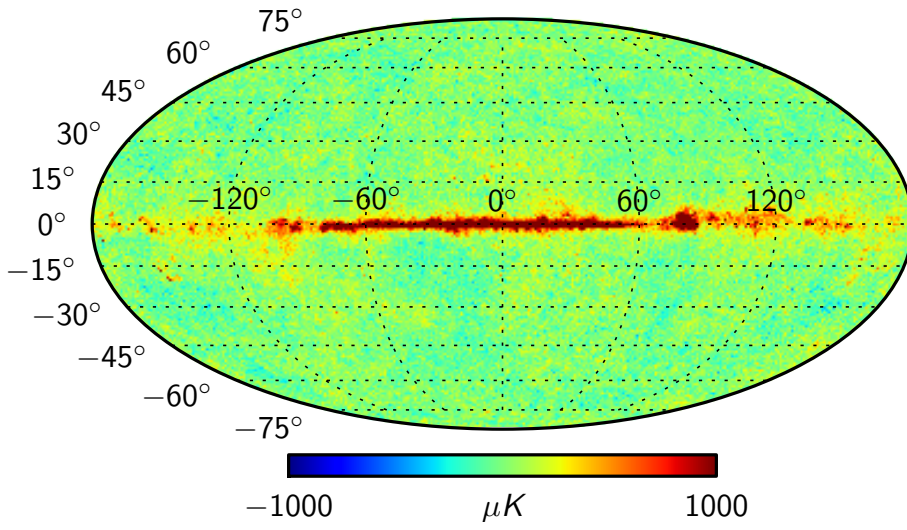An example map is shown in the three standard sizes, and also with two different colour tables.
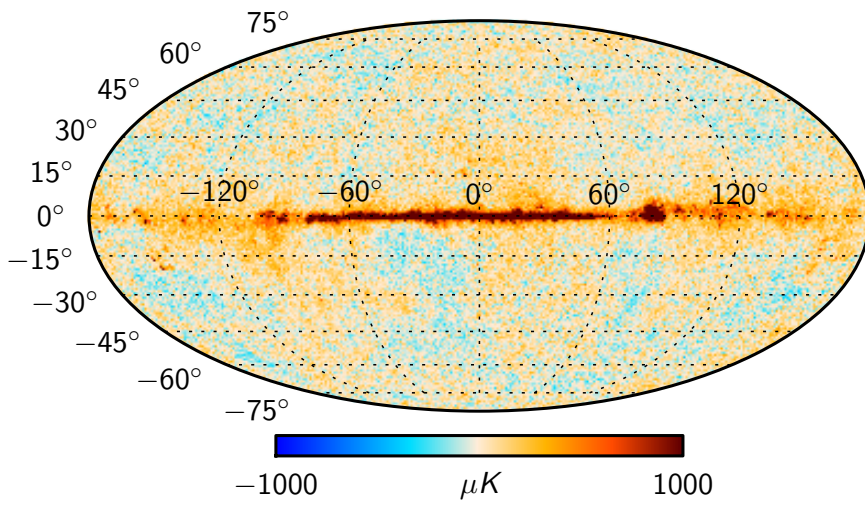
3.1. Python
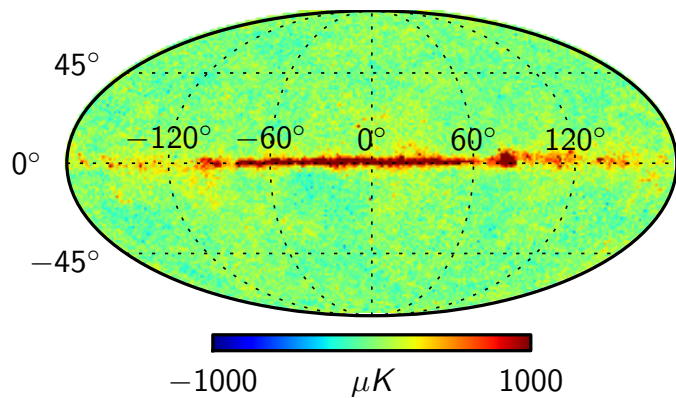
Fig. 13. Mollview, 88 mm wide. The map itself is bitmapped, but all text is vectorized.
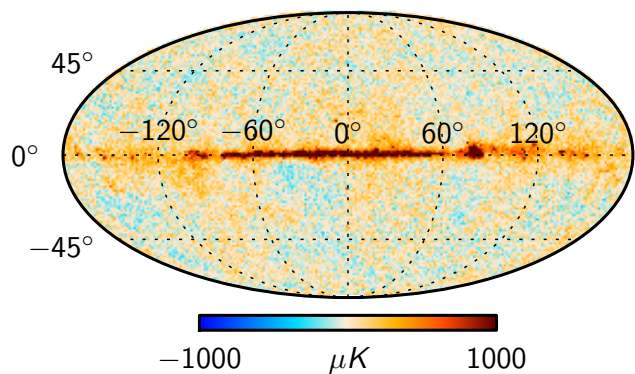
Fig. 14. Mollview, 88 mm wide. The map itself is bitmapped, but all text is vectorized.
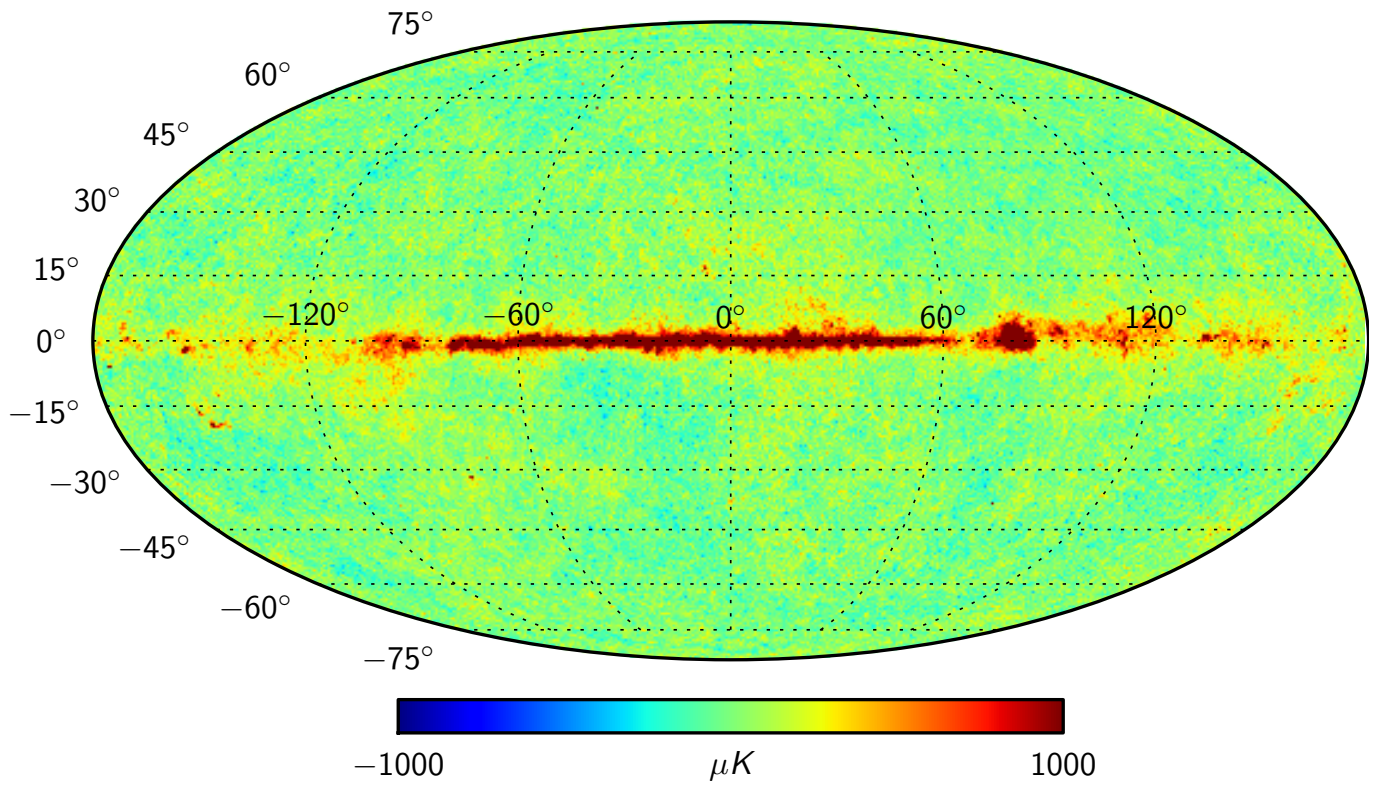
Fig. 15. Mollview, 120 mm wide. The map itself is bitmapped, but all text is vectorized.
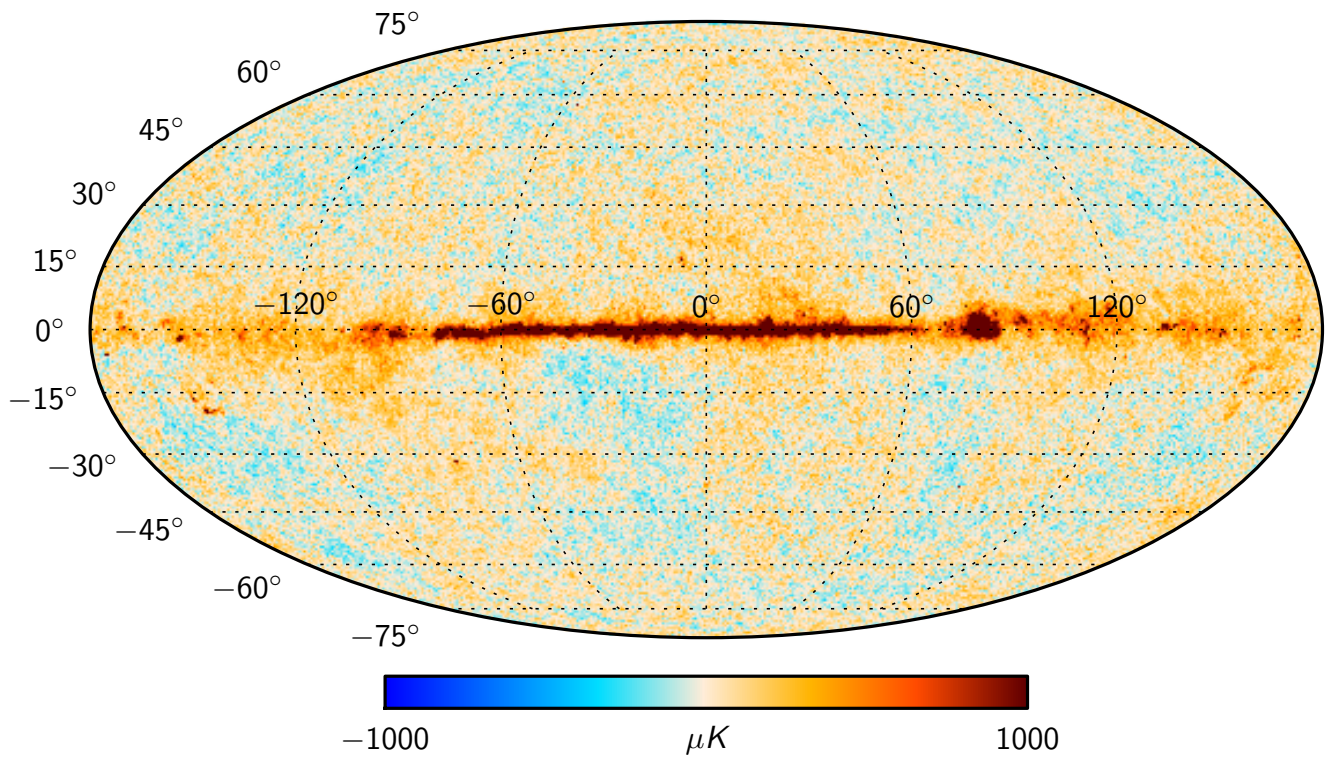

Fig. 16. Mollview, 120 mm wide. The map itself is bitmapped, but all text is vectorized.
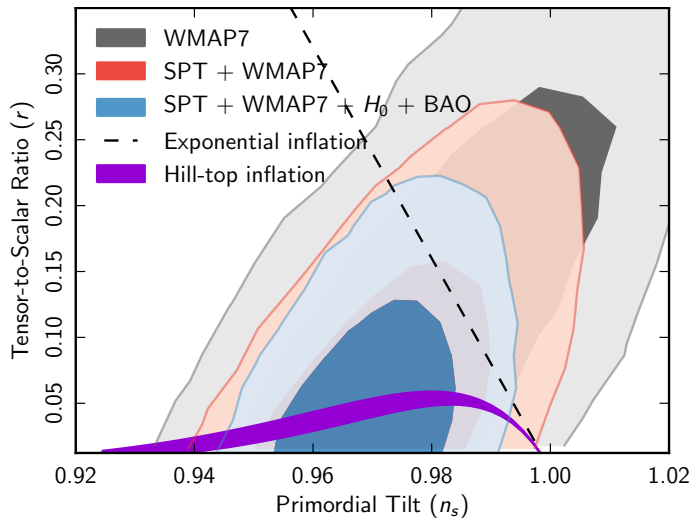
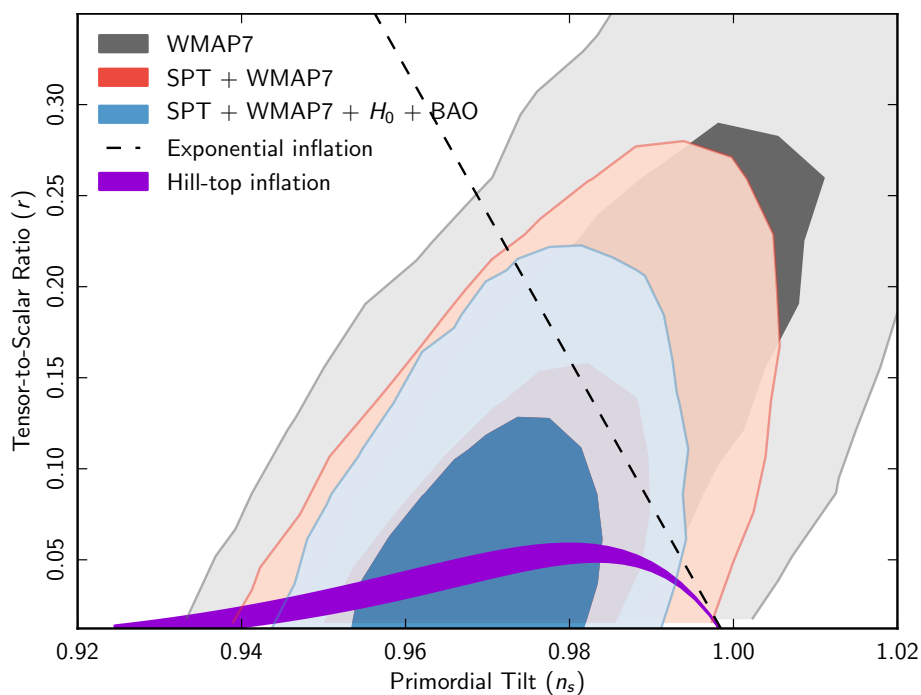**Fig. 17.** Mollview, 180 mm wide. The map itself is bitmapped, but all text is vectorized.

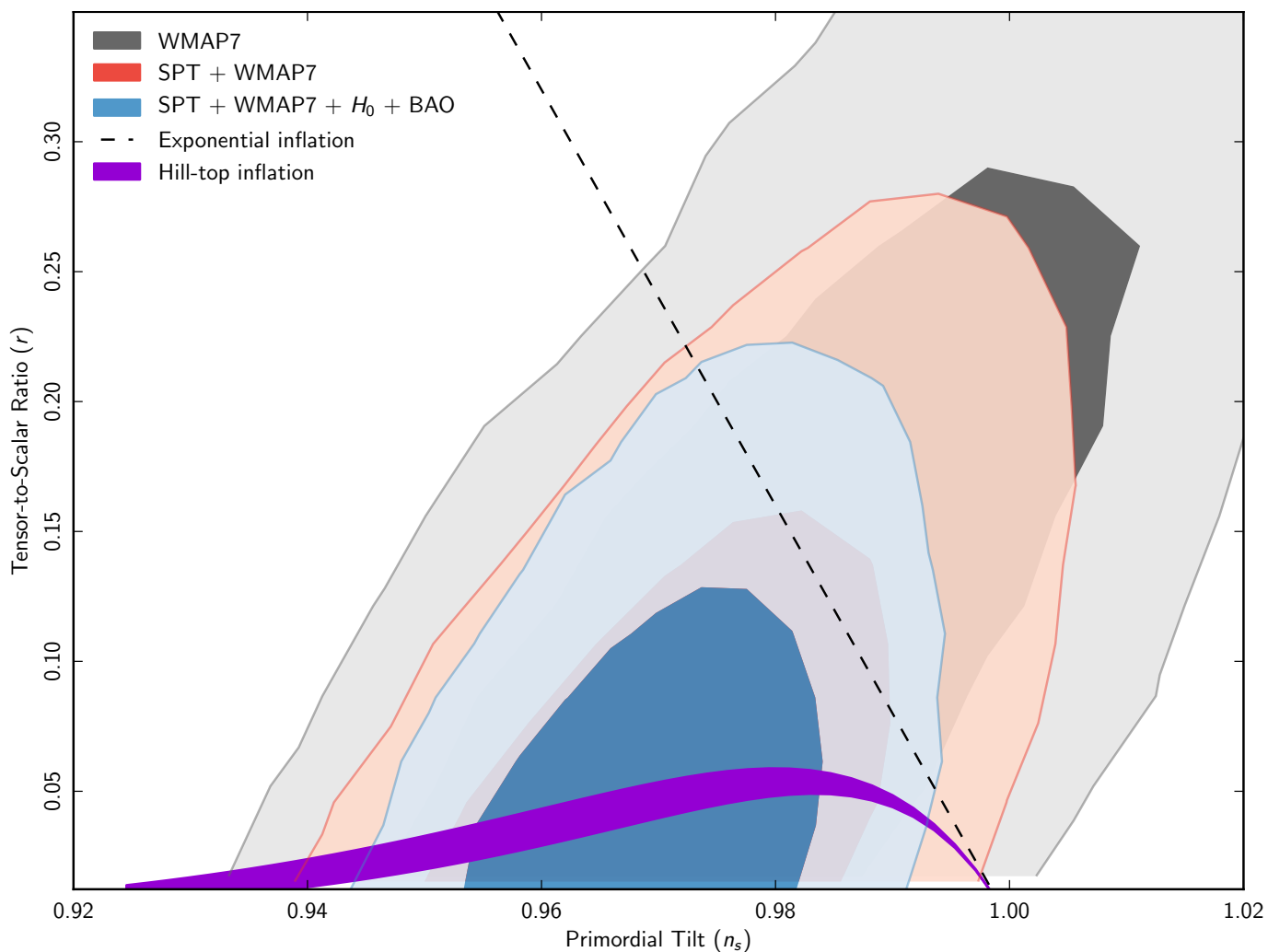**Fig. 18.** Mollview, 180 mm wide. The map itself is bitmapped, but all text is vectorized.

4. Parameter-type plots

Fig. 19. Parameters, 88 mm wide. The use of transparency is essential for clarity.

Fig. 20. Parameters, 120 mm wide. The use of transparency is essential for clarity.

Fig. 21. Parameters, 180 mm wide. The use of transparency is essential for clarity.