## ONLINE MATERIAL

This document provides figures supporting the main journal manuscript "The Thousand-Pulsar-Array programme on MeerKAT - XII: Discovery of long-term pulse profile evolution in 7 young pulsars" by *Basu et al.* published in MNRAS in 2024. In this document, we present the difference maps of the total intensity for all 8 sources presented in the paper. Out of these eight, for seven we discovered long-term evolution in the pulse profile. For the other (PSR J1919+0021) the variability has been identified to be associated with short-term (at the single-pulse level) changes in the emission.

In Sec. A figures are presented to show the effect of smoothing on the total intensity data. In addition, the results of the jitter simulations are presented to assess the effect of single-pulse variability. The figures illustrating the profile variability in polarization can be found in Sec. B.

## APPENDIX A: FIGURES OF TOTAL INTENSITY DIFFERENCE MAPS

For each of the 8 sources there is one figure, each having 5 panels. All panels are resampled uniformly in time. For details please refer to the main journal. The top panel shows the difference map obtained from the observations without any smoothing. The second panel from the top displays the smoothened version of the same map after a 2D Gaussian convolution is applied. The middle panel shows the difference map uniformly spaced in time with each epoch predicted using a Gaussian process regression algorithm. The second to last panel shows the not smoothed difference map showing the expected variability to originate from jitter at the single pulse level. This is for the simulation assuming that there is no memory effect such that the single-pulse variability is independent from pulse to pulse: the individual pulse method (IPM). The last panel shows corresponds to the Block method (BM) simulation of pulse-jitter, which takes memory as could arise from mode changing, nulling and drifting if present.

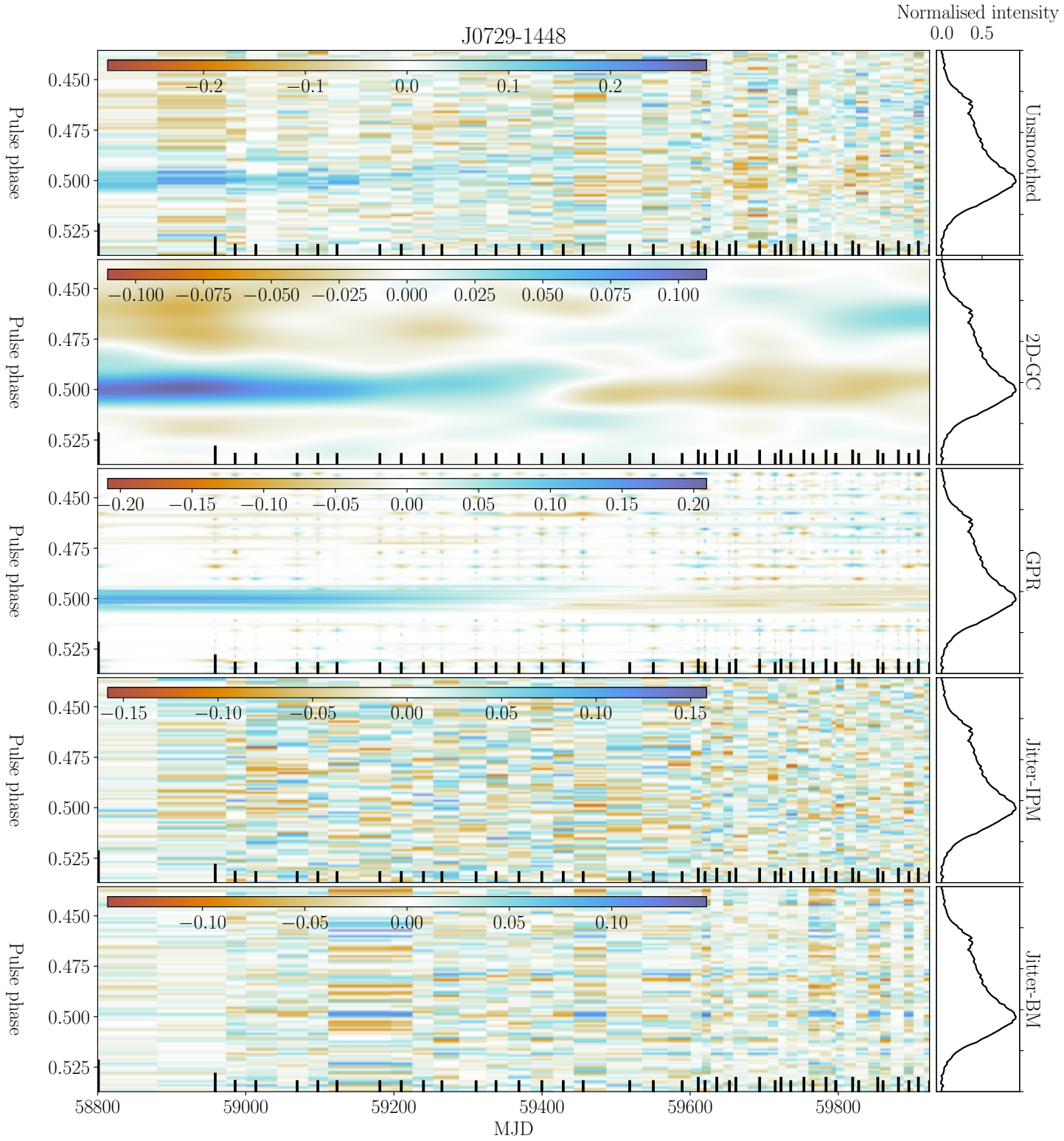


**Figure A1.** The top panel of the figure shows the difference map obtained after re-sampling the data uniformly in time (see Sec. 3.6) for pulsar J0729−1448. The second panel from the top shows the smoothed version of a difference map obtained after convolving the map from the upper panel with a 2D Gaussian kernel. The third panel from the top shows another smoothed version of the difference map obtained by the technique of Gaussian process regression as discussed in Sec. 3.6. The fourth panel from the top shows the re-sampled version of a difference map obtained from the jitter simulation IPM method (refer to the Sec. 3.1.1), similarly, the last panel also shows the difference map obtained from the block method of the jitter simulation as discussed in the Sec. 3.1.2. The position of the vertical tick marks indicates the observation epoch and their length corresponds to the length of observations.

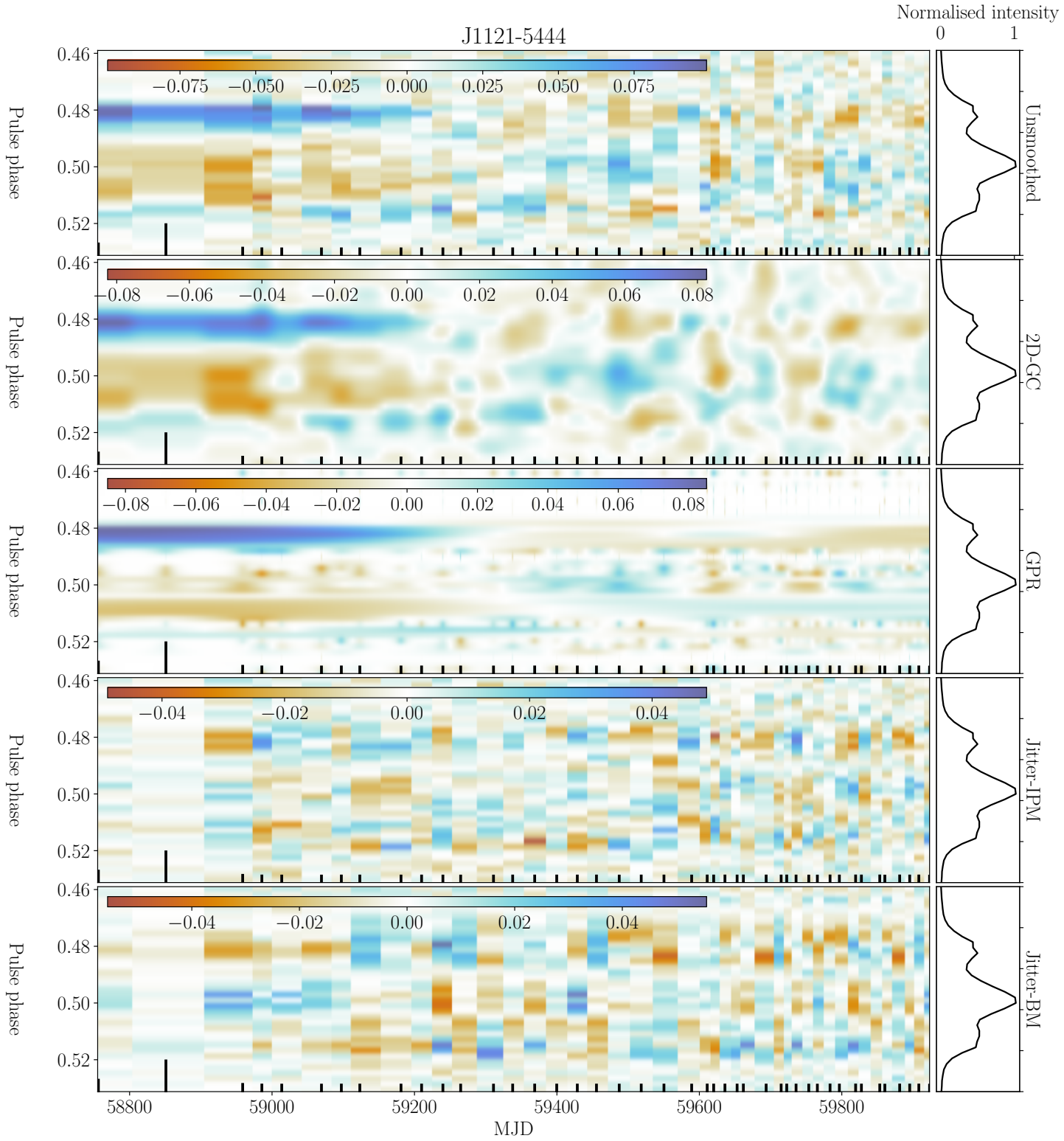


**Figure A2.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1121−5444.

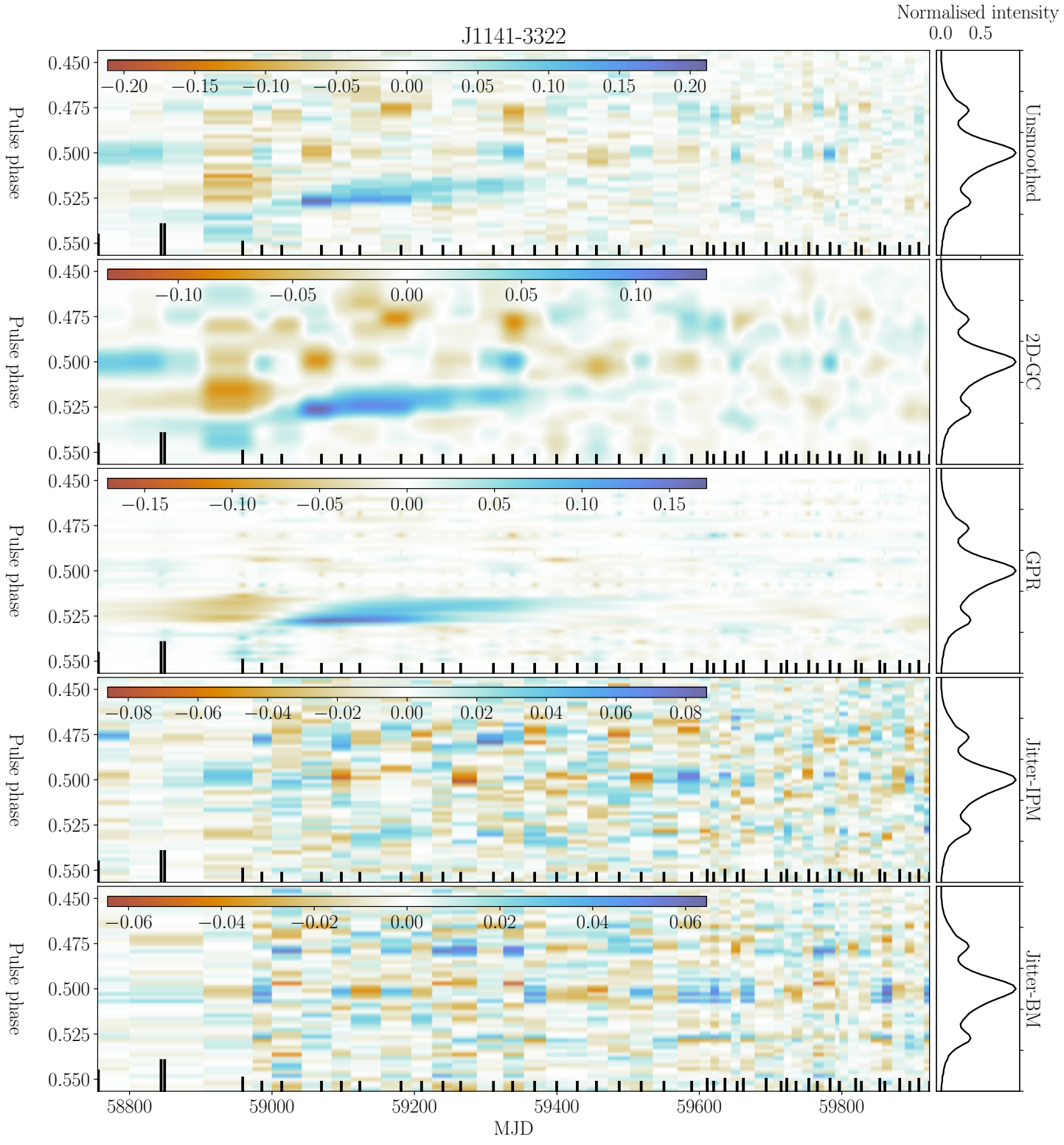


**Figure A3.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1141−3322.

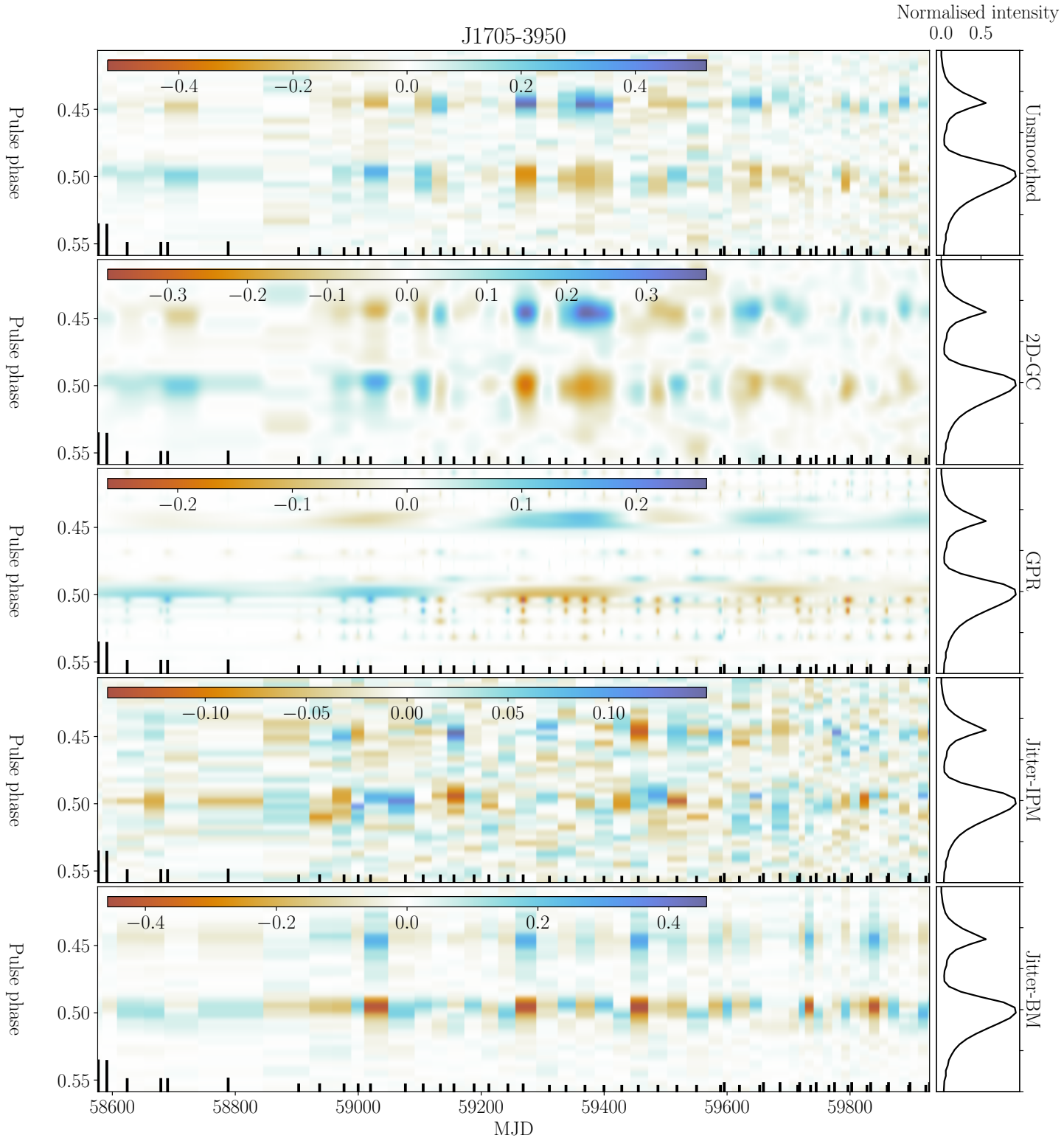


**Figure A4.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1705−3950

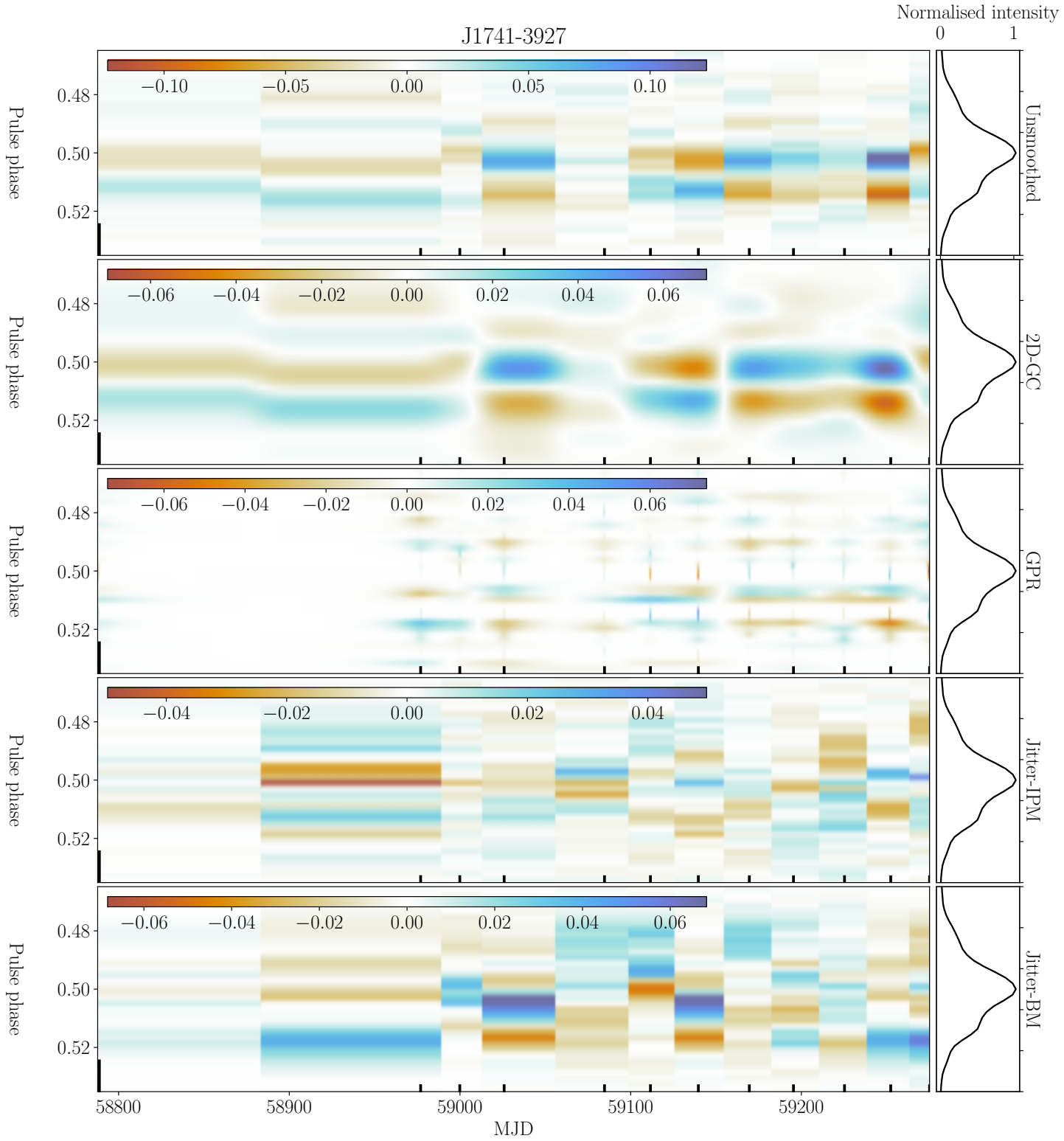


**Figure A5.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1741−3927

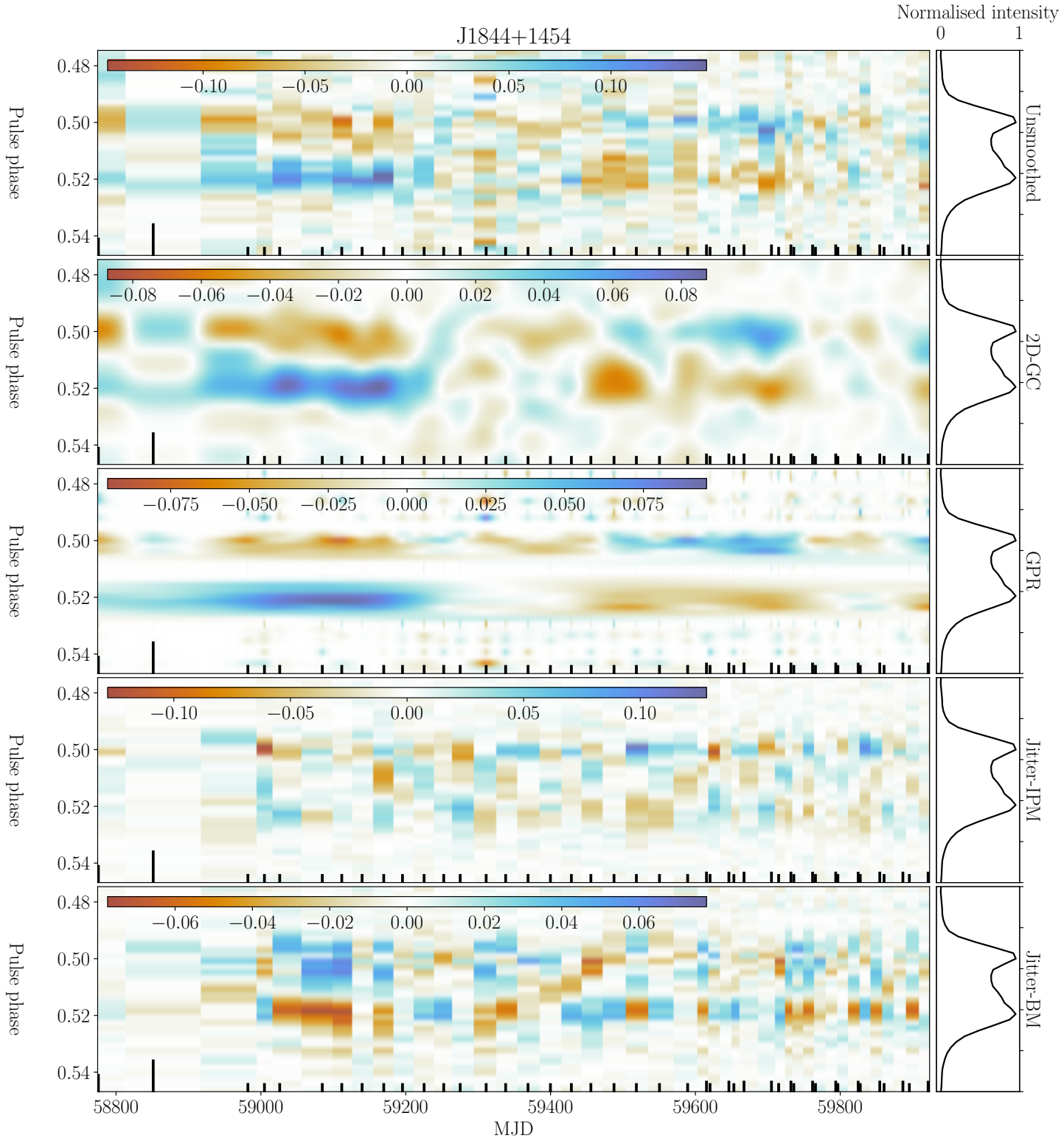


**Figure A6.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1844+1454

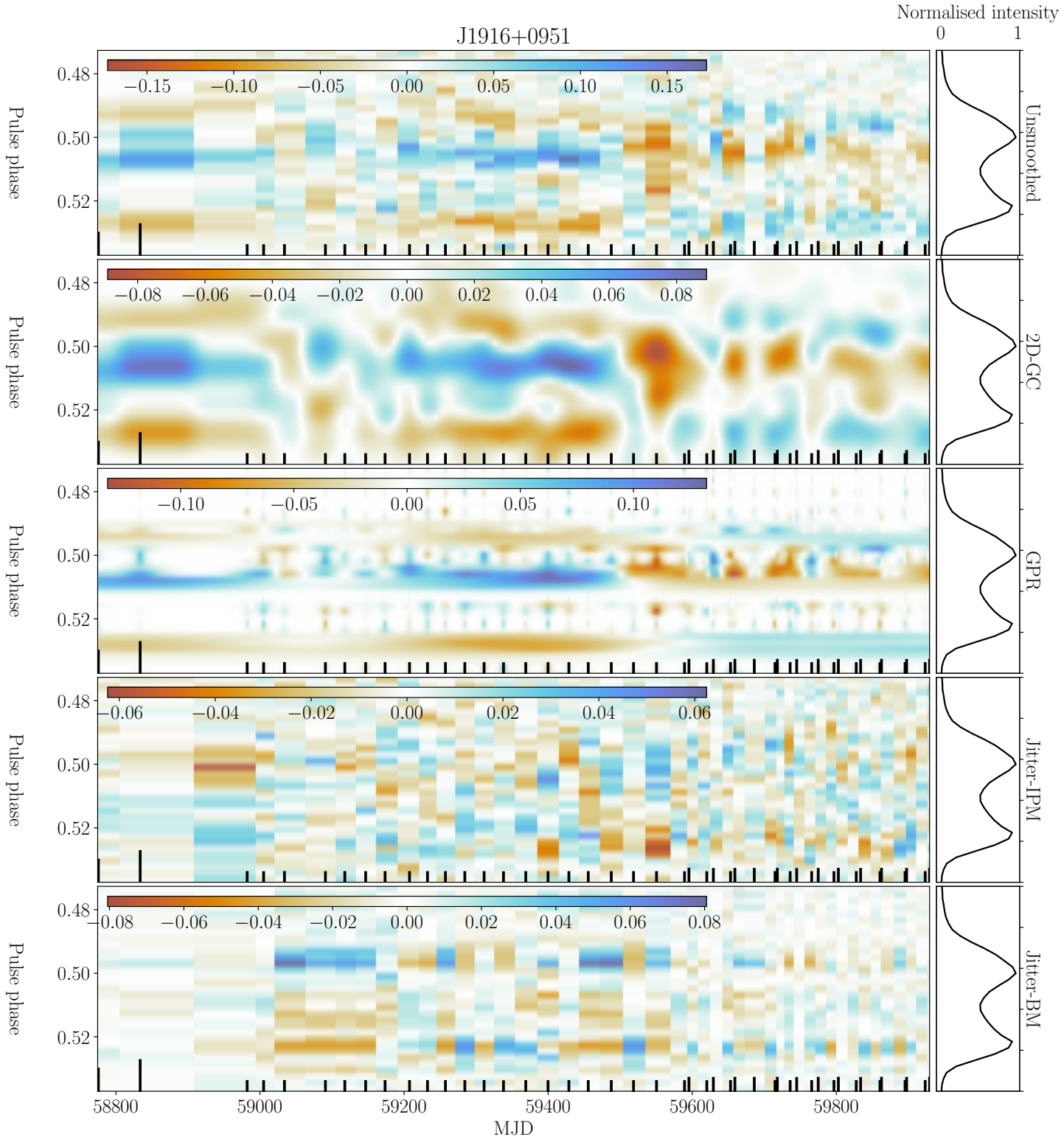


**Figure A7.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1916+0951

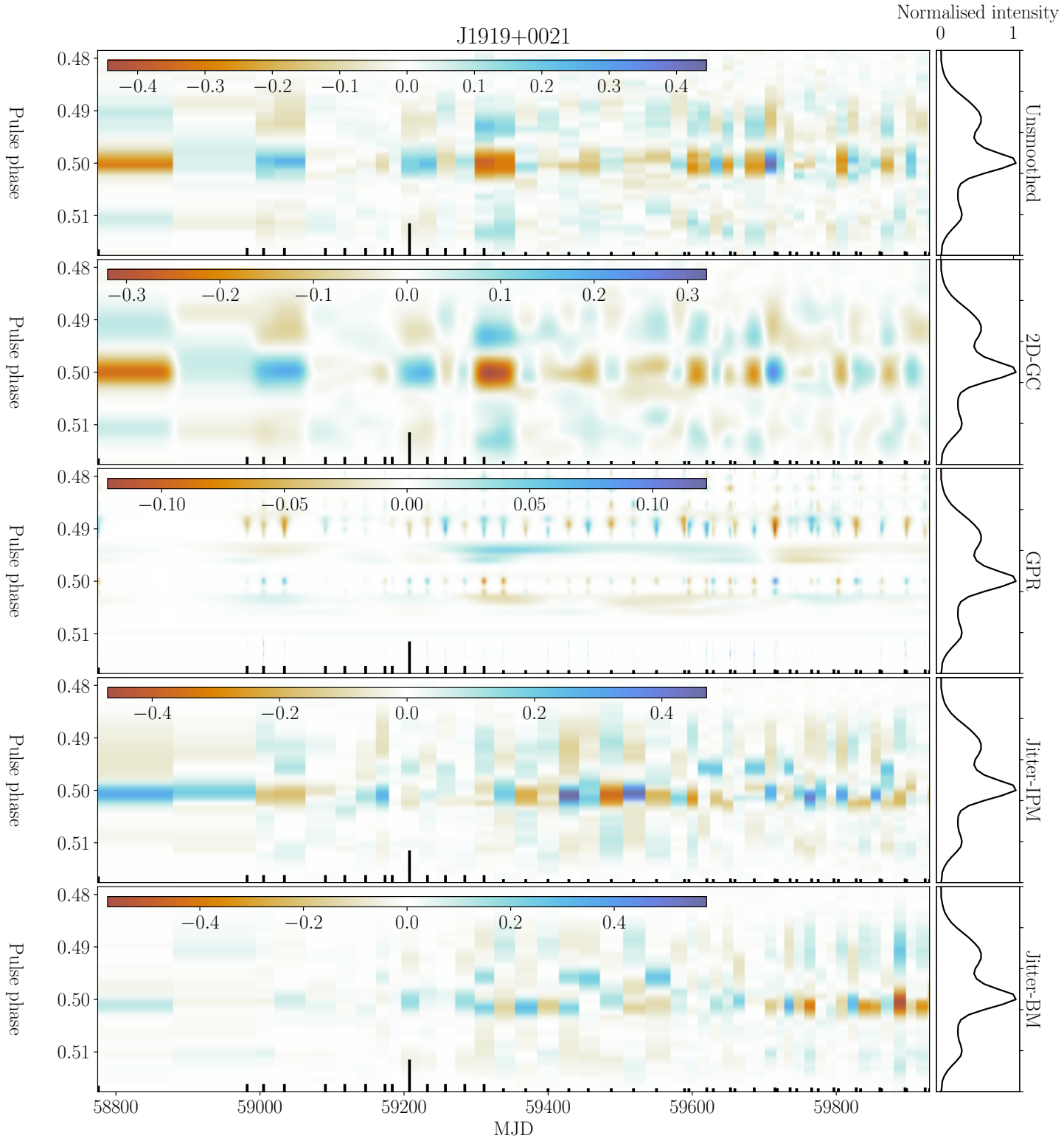


**Figure A8.** The figure provides the similar information as conveyed in Fig. A1, but for PSR J1919+0021

## APPENDIX B: FIGURES OF POLARIZATION FRACTION AND POLARIZATION POSITION ANGLE DIFFERENCE MAPS

This section provides the difference maps of various polarization products for all pulsars. There are three figures for every pulsar, and every figure has four panels. The first figure for each pulsar is derived from the actual data. The second and last figure displays the outcome of the IPM and BM jitter simulation respectively. All these difference maps are smoothed by convolution with a 2D Gaussian kernel. No smoothing is applied to the jitter-simulated total intensity difference maps. The details on the results of the polarization analysis are discussed in Sec. 3.2 in the main paper.

In each of these figures, the top panel represents the total intensity difference map. The second and third panel show the difference map of the linear and circular polarization fraction respectively. The bottom panel shows the polarization position angle (PA or $\psi$) difference map.

This paper has been typeset from a TEX/LATEX file prepared by the author.

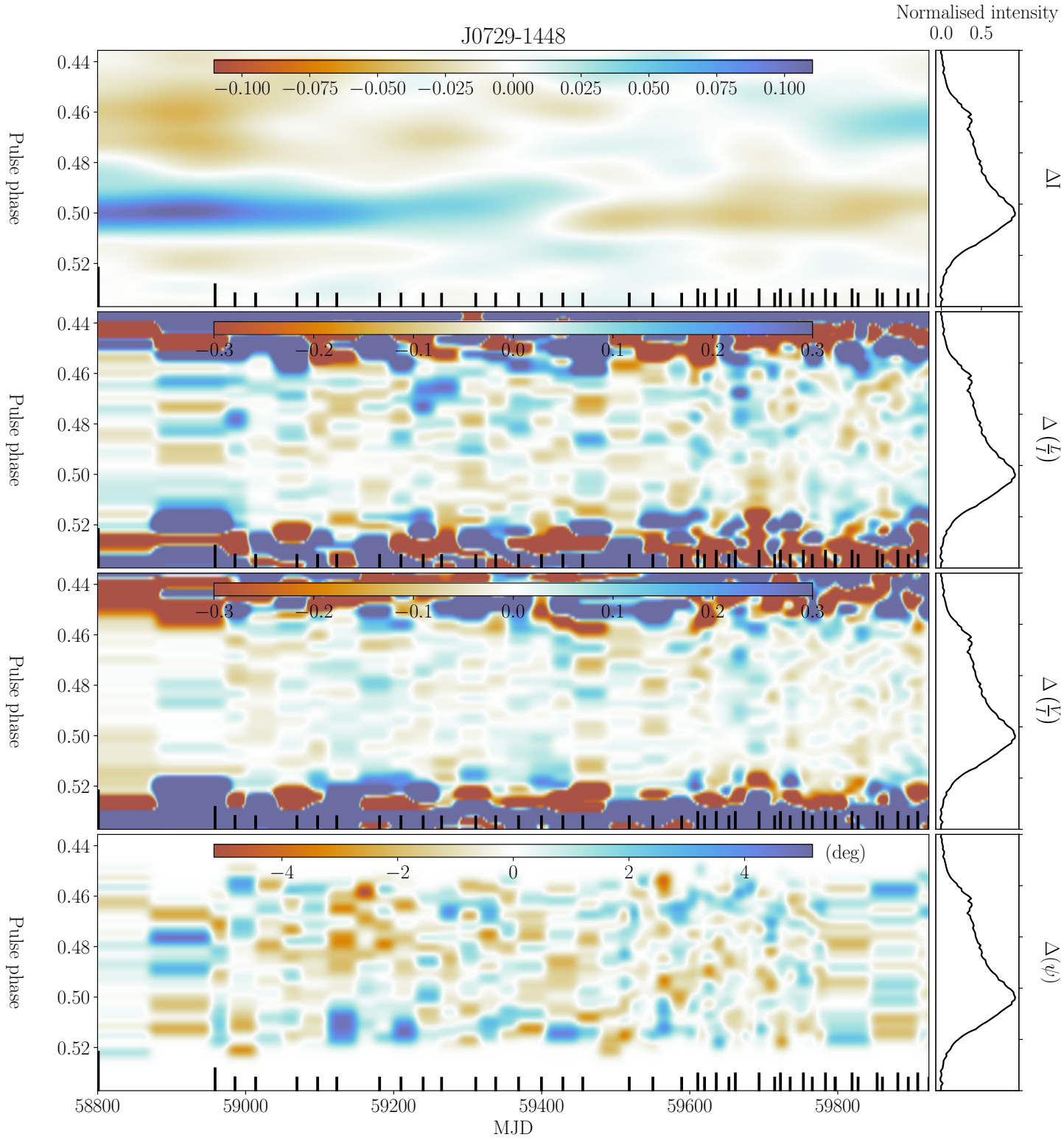


**Figure B1.** This figure captures the emission variability for PSR J0729−1448. The top panel of the figure shows the 2D convolution smoothed version of the difference map for total intensity, zoomed in on the on-pulse phase range. The second and the third panel from the top shows the smoothed version of the difference map for the $L/I$ and $V/I$. The bottom panel shows the difference map for the polarization position angle. The position of the vertical tick marks indicates the observation epoch and their length corresponds to the length of observations. Details of the analysis are presented in Sec. 3.2.

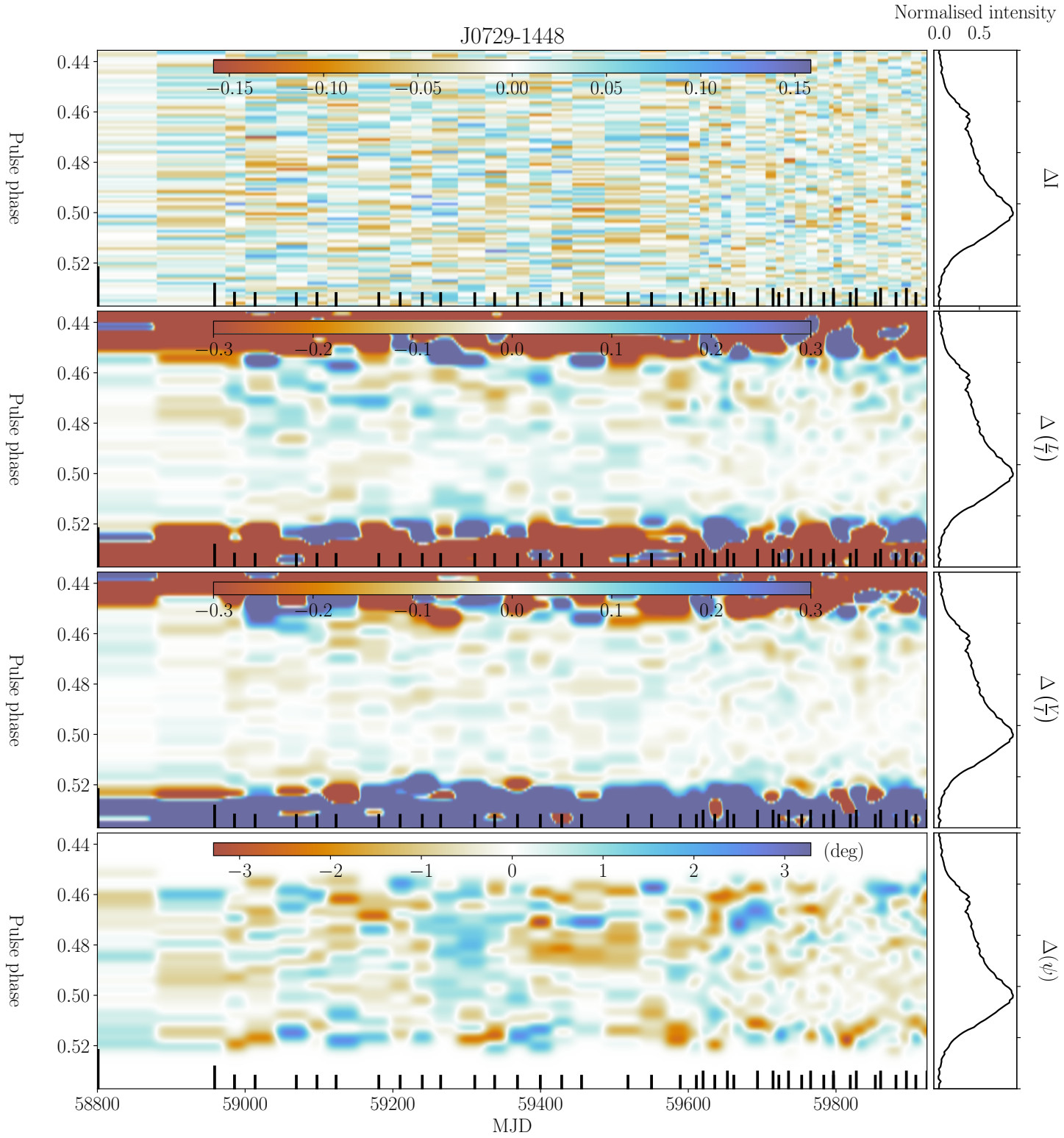


**Figure B2.** This figure captures the same information as shown in Fig. B1, but in this case, the data was generated using the jitter simulation using IPM, discussed in Sec. 3.1.1.

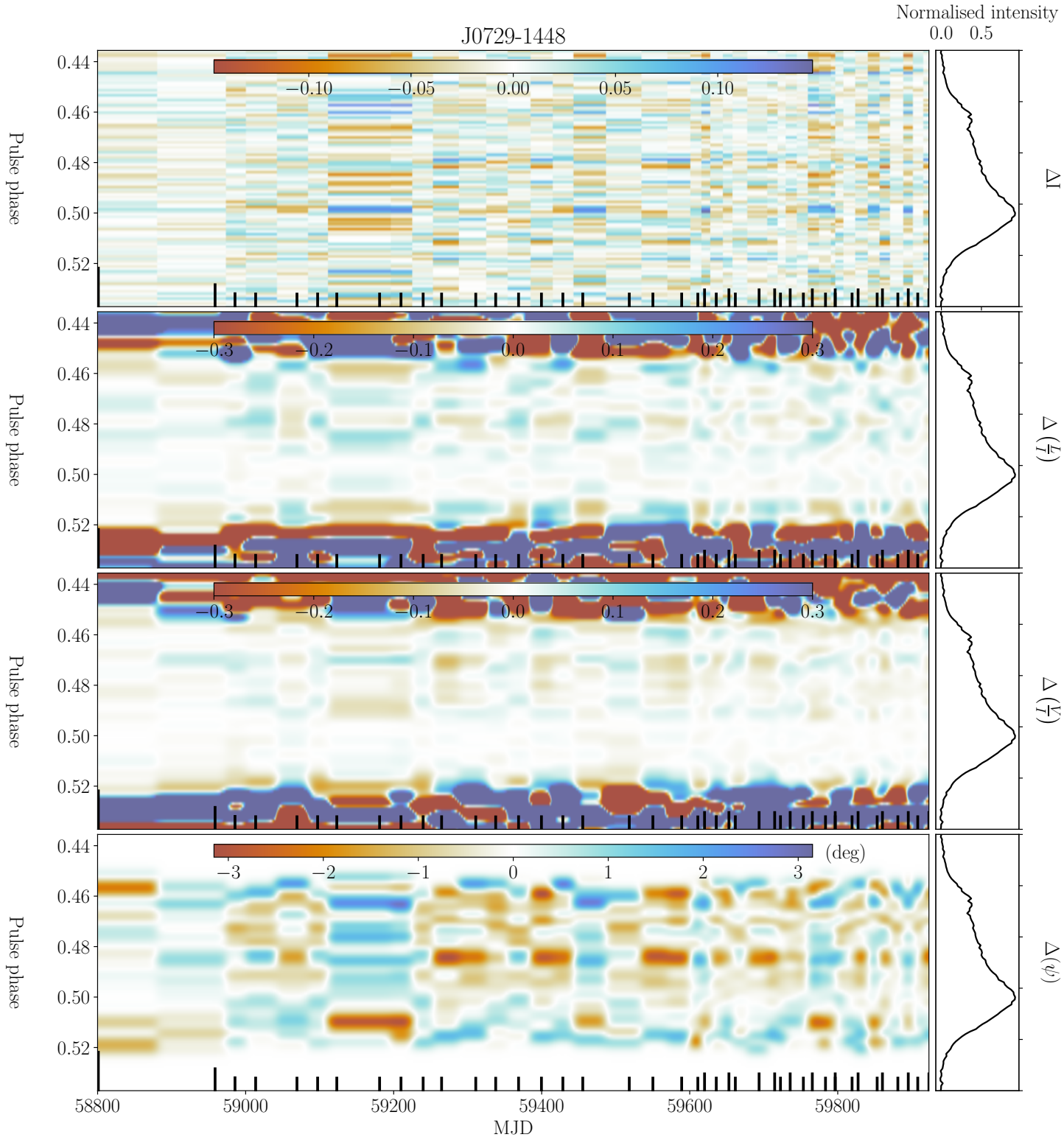


**Figure B3.** This figure captures the same information as shown in Fig. B1, but in this case, the data was generated using the jitter simulation using BM as described in Sec. 3.1.2.

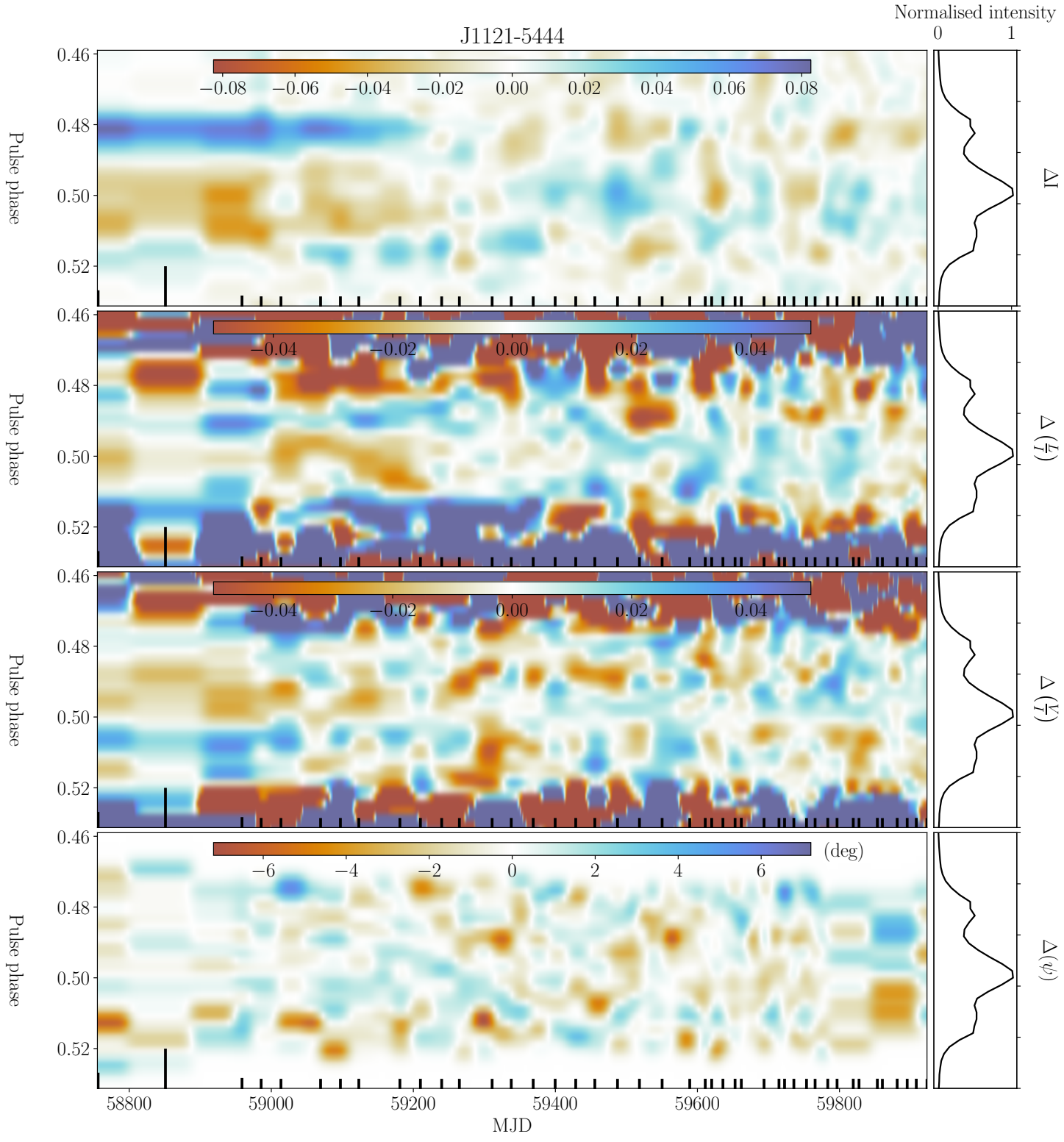


**Figure B4.** This figure conveys the same information as that of Fig.B1 but for PSR J1121−5444.

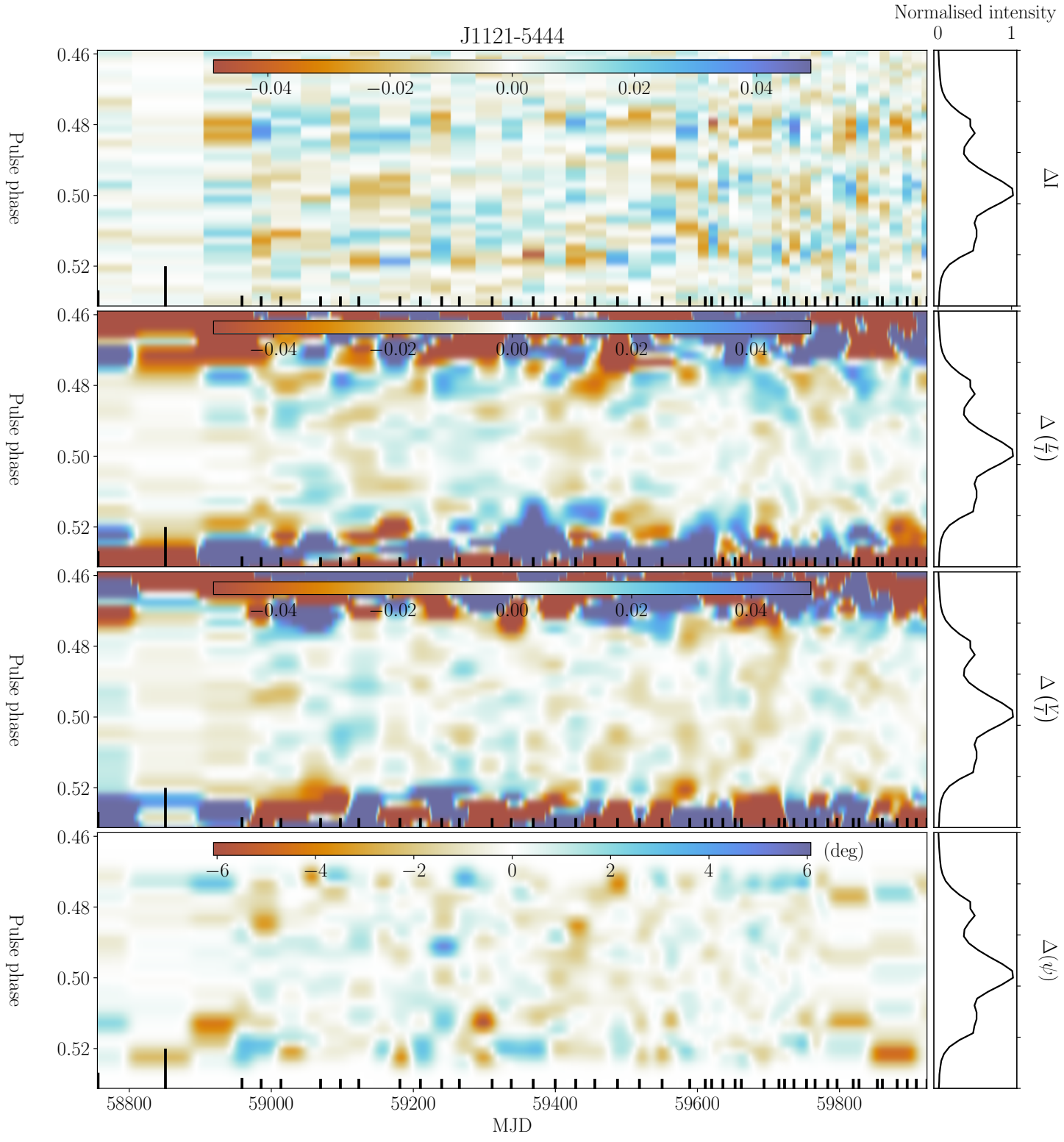


**Figure B5.** The figure captures the same information as shown in Fig. B2 but for PSR J1121−5444.

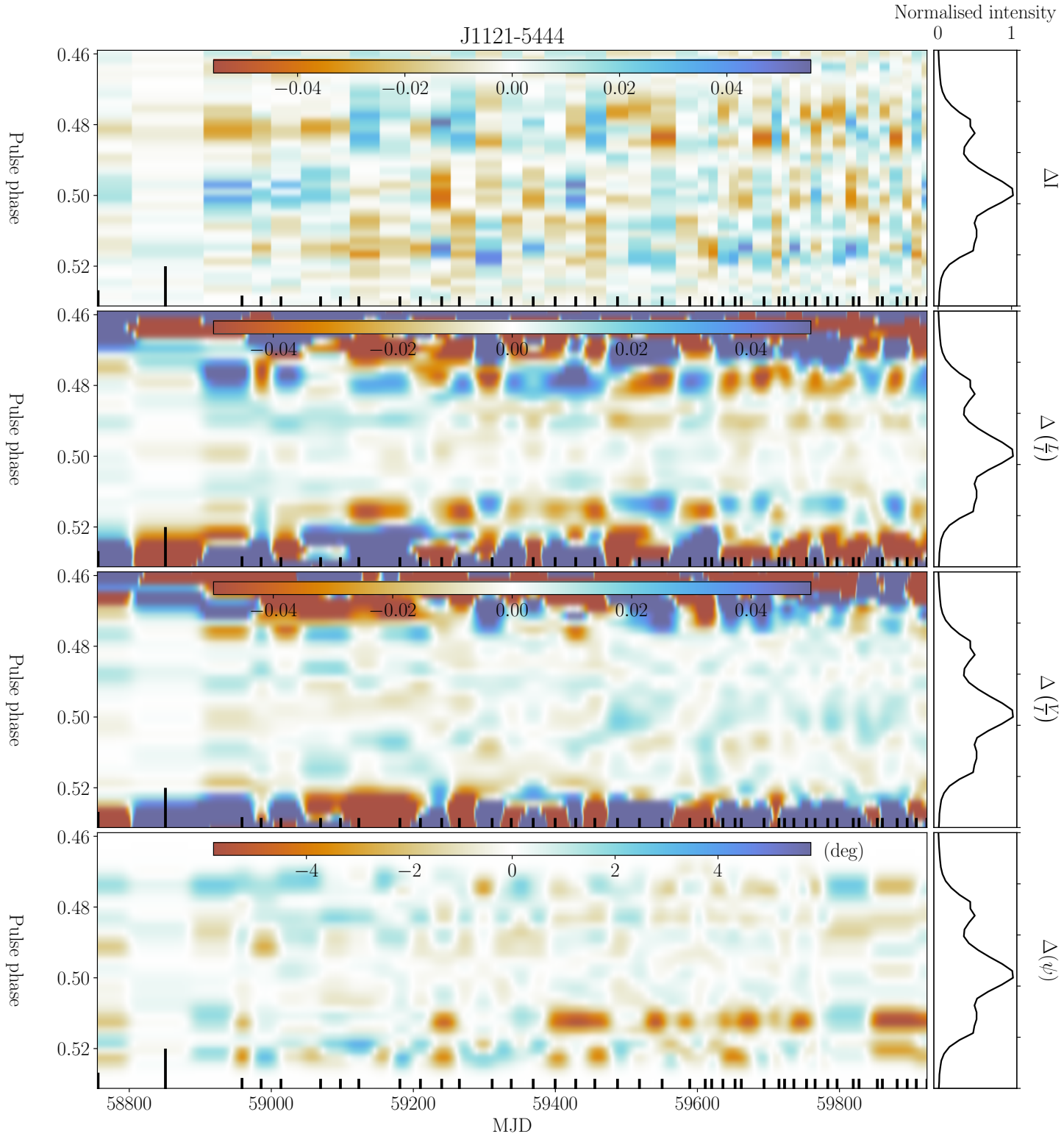


**Figure B6.** The figure captures the same information as shown in Fig. B3 but for PSR J1121−5444.

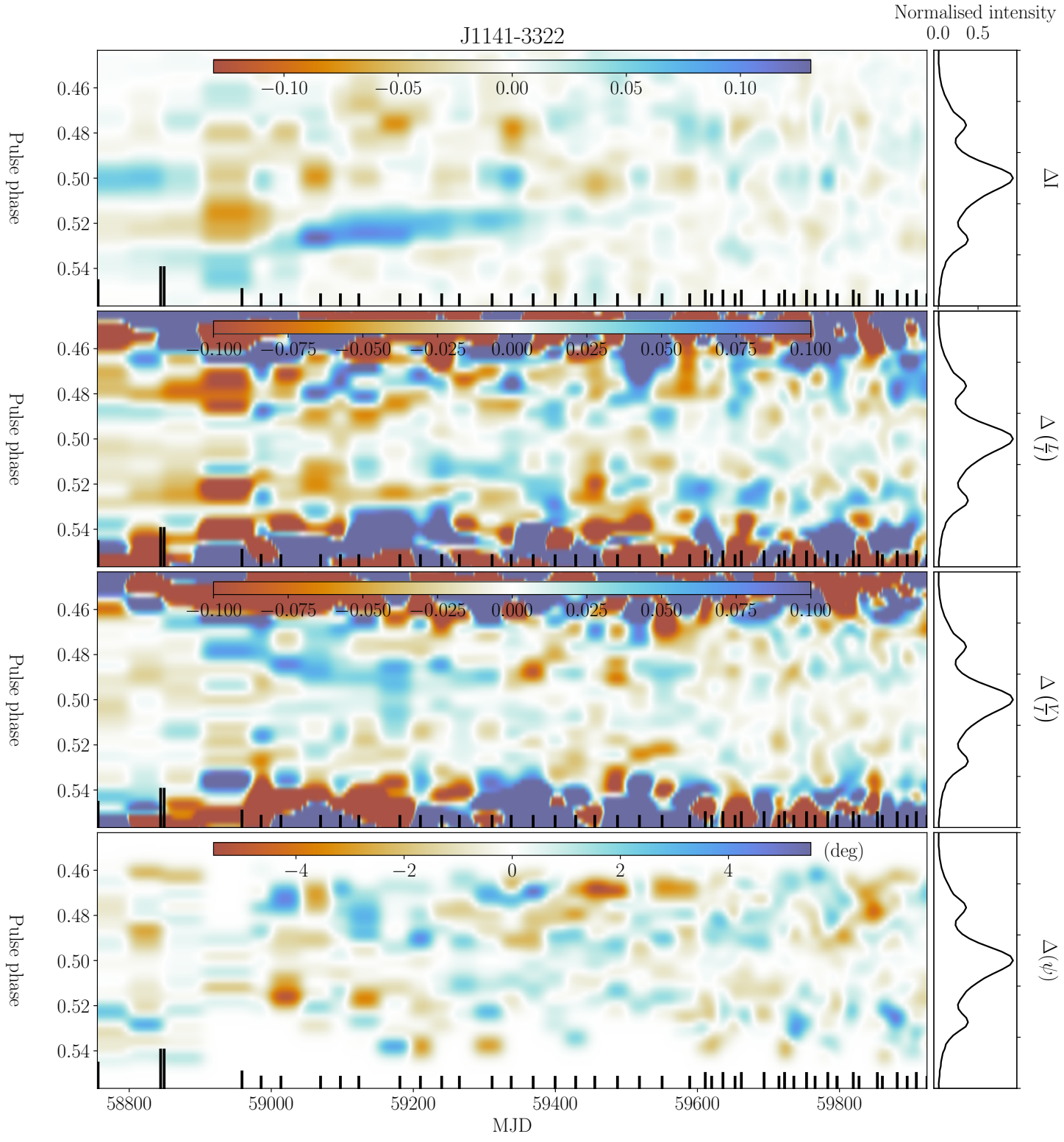


**Figure B7.** This figure conveys the same information as that of Fig.B1 but for PSR J1141−3322.

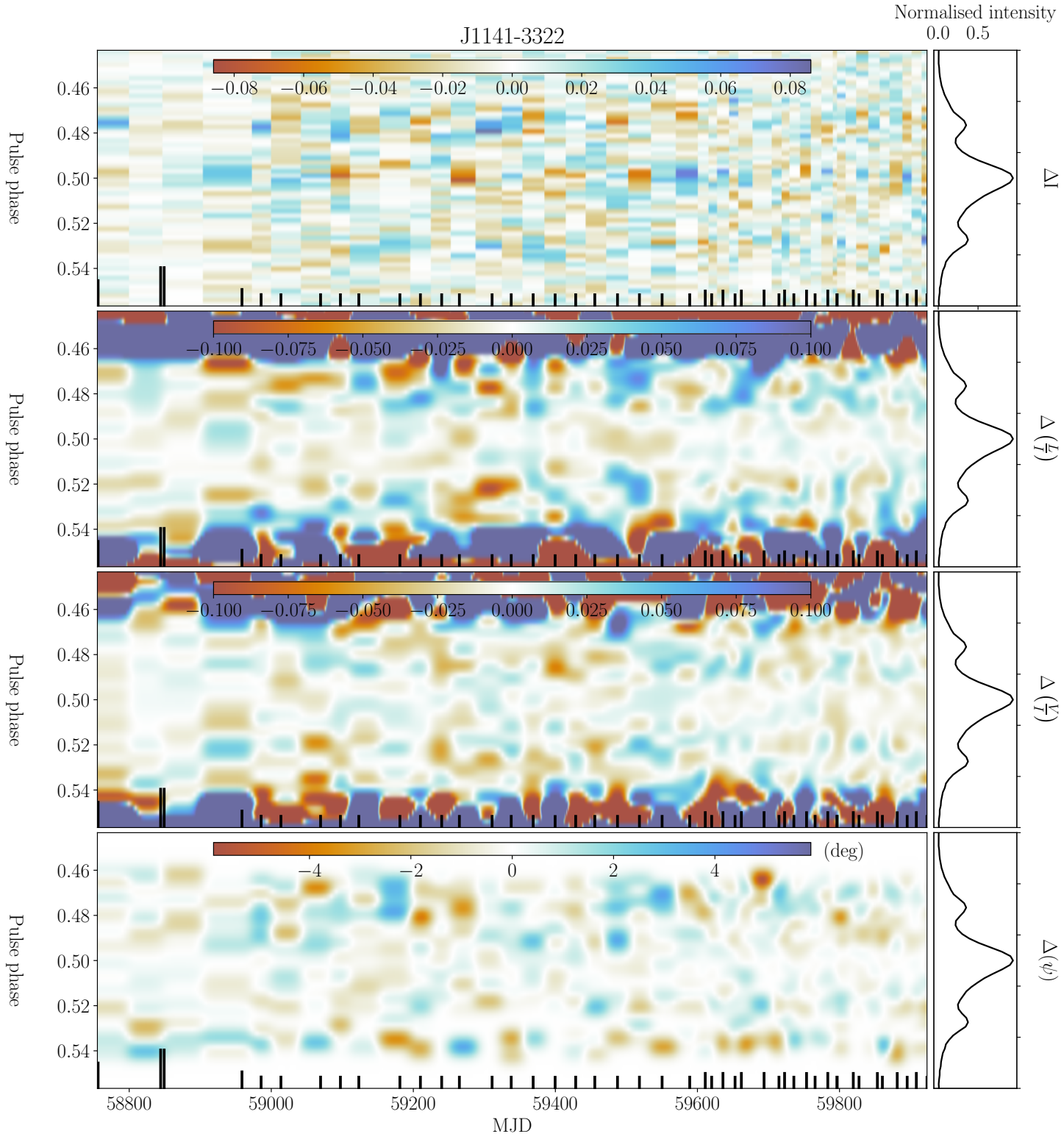


**Figure B8.** The figure captures the same information as shown in Fig. B2 but for PSR J1141−3322.

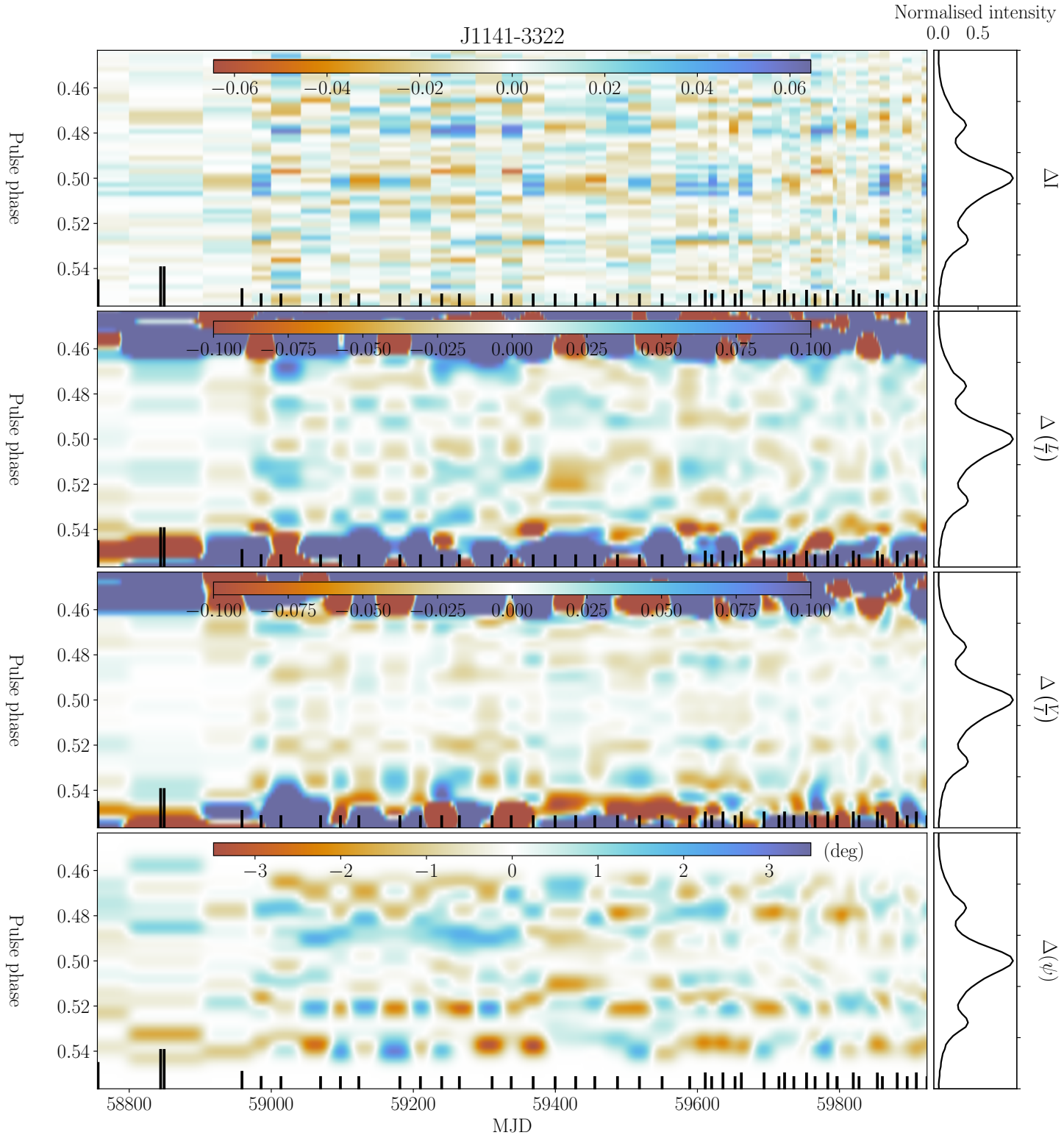


**Figure B9.** The figure captures the same information as shown in Fig. B3 but for PSR J1141−3322.

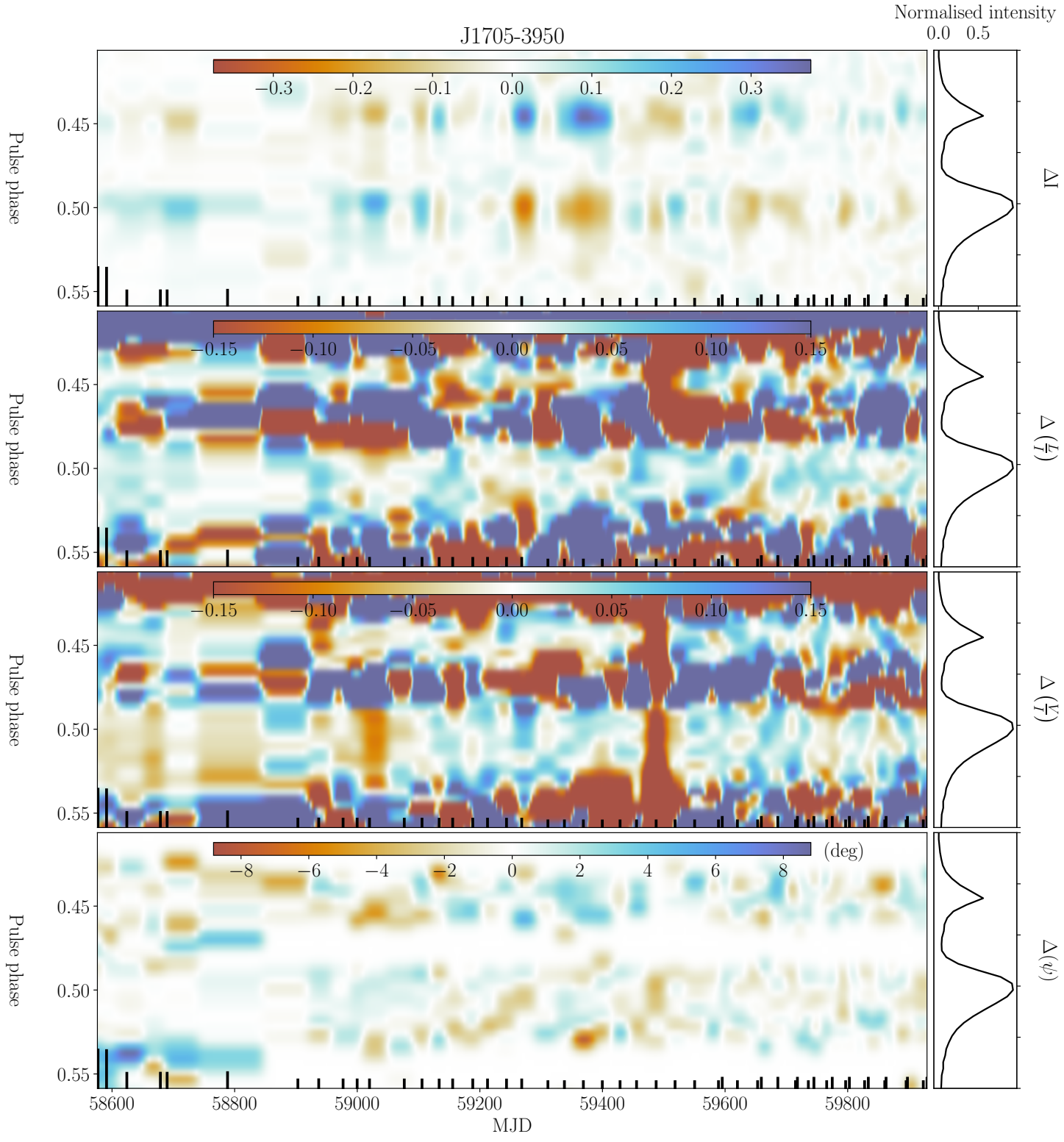


**Figure B10.** This figure conveys the same information as that of Fig.B1 but for PSR J1705−3950.

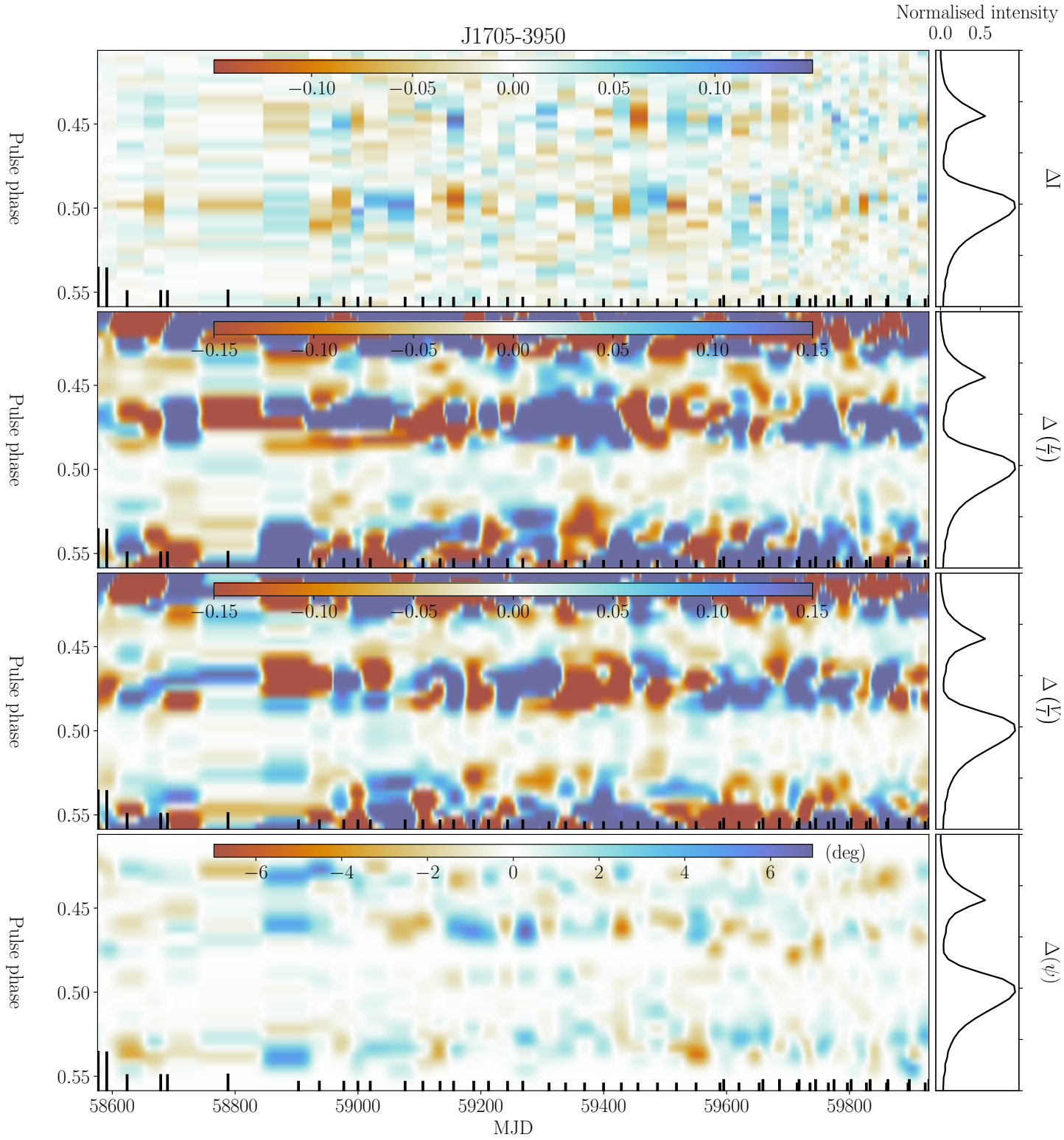


**Figure B11.** The figure captures the same information as shown in Fig. B2 but for PSR J1705−3950.

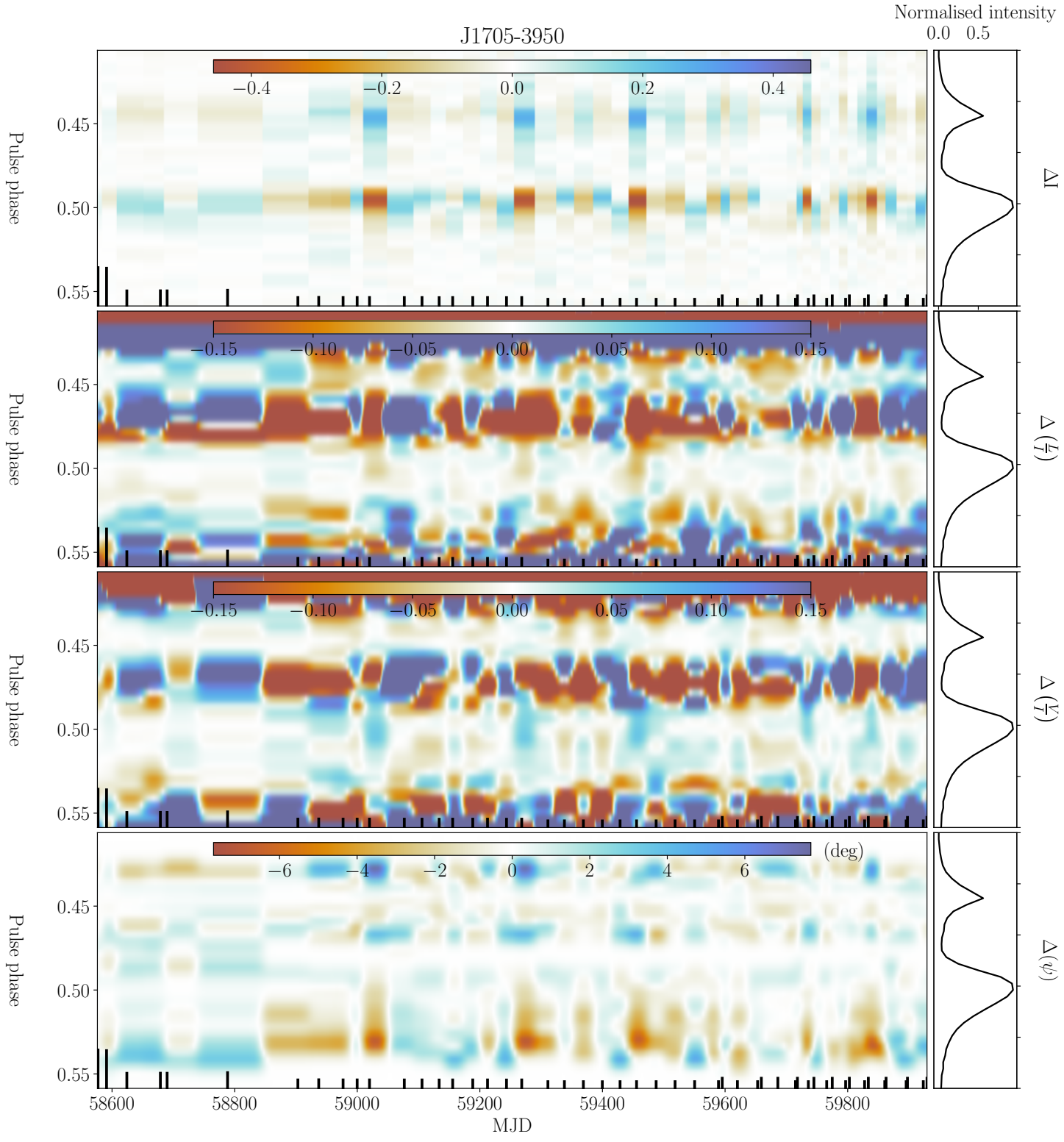


**Figure B12.** The figure captures the same information as shown in Fig. B3 but for PSR J1705−3950.

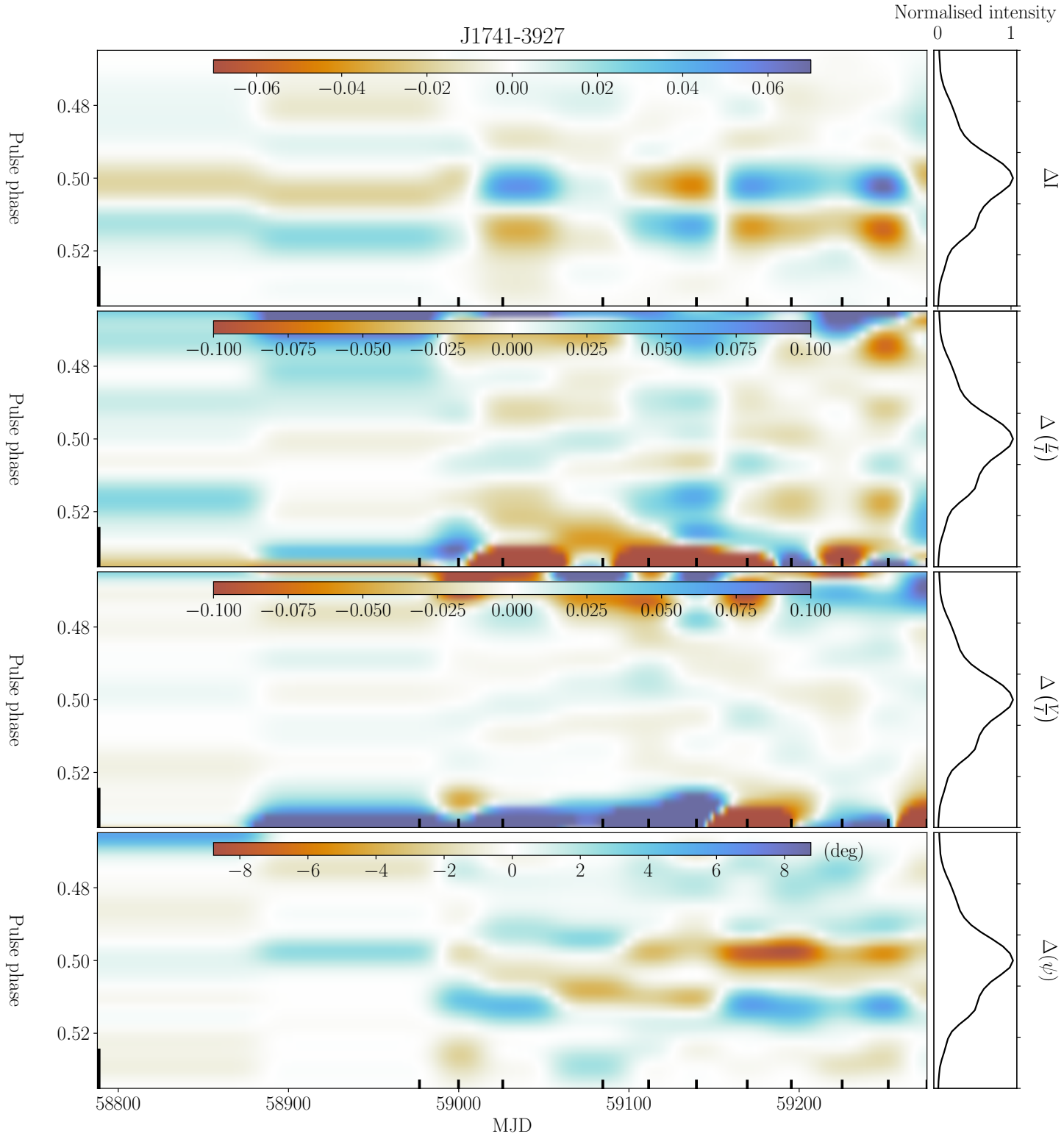


**Figure B13.** This figure conveys the same information as that of Fig.B1 but for PSR J1741−3927.

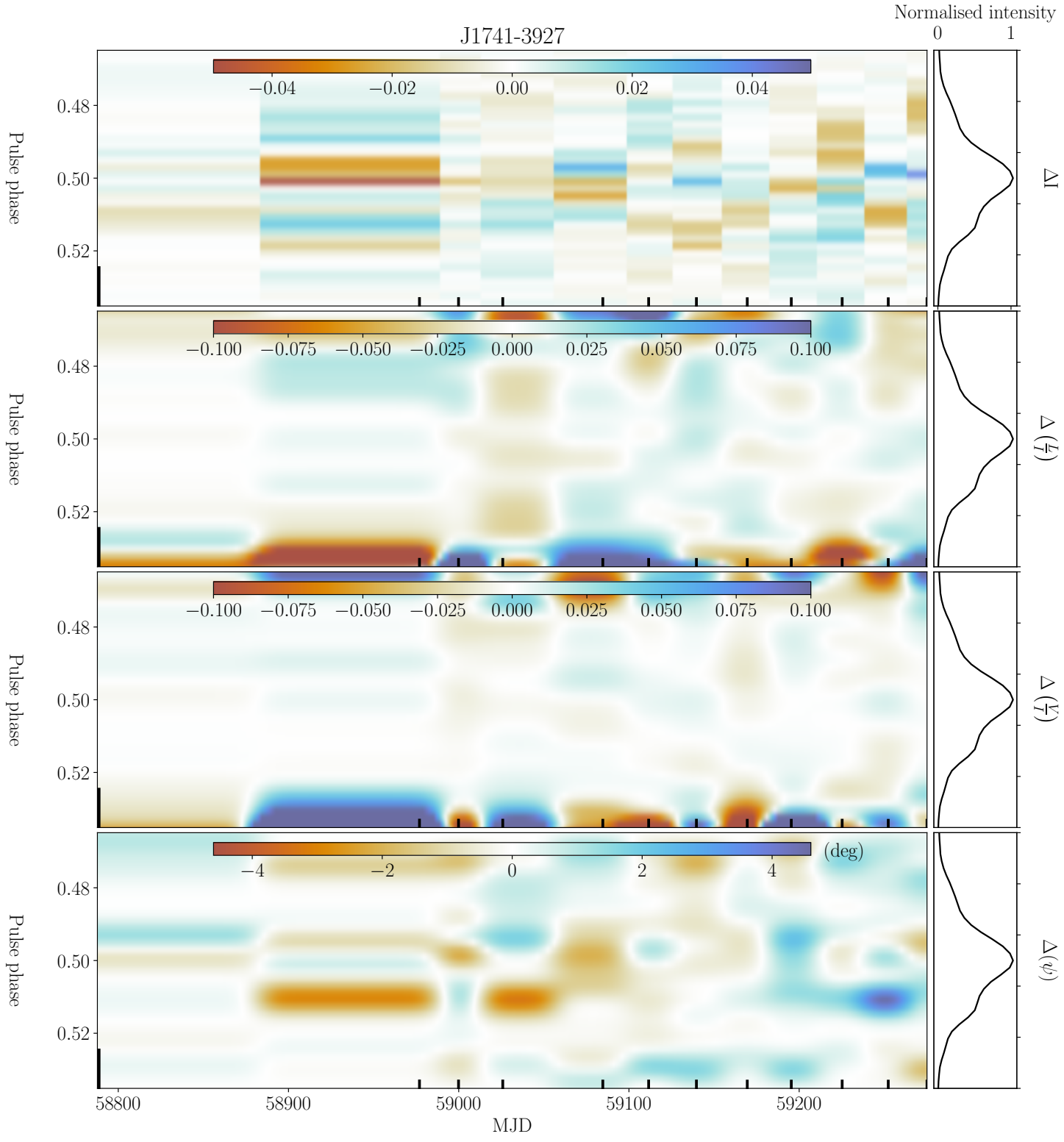


**Figure B14.** The figure captures the same information as shown in Fig. B2 but for PSR J1741−3927.

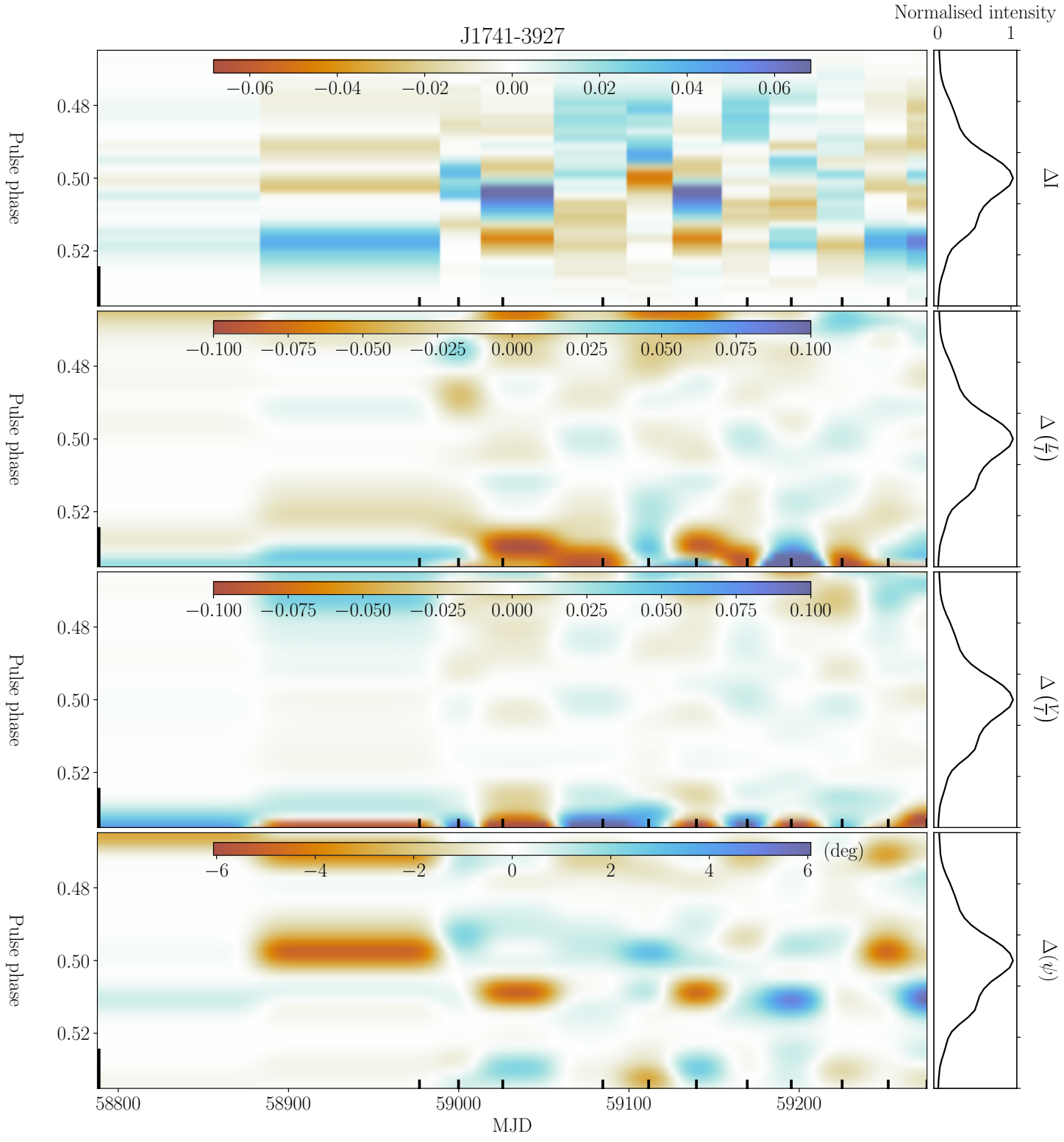


**Figure B15.** The figure captures the same information as shown in Fig. B3 but for PSR J1741−3927.

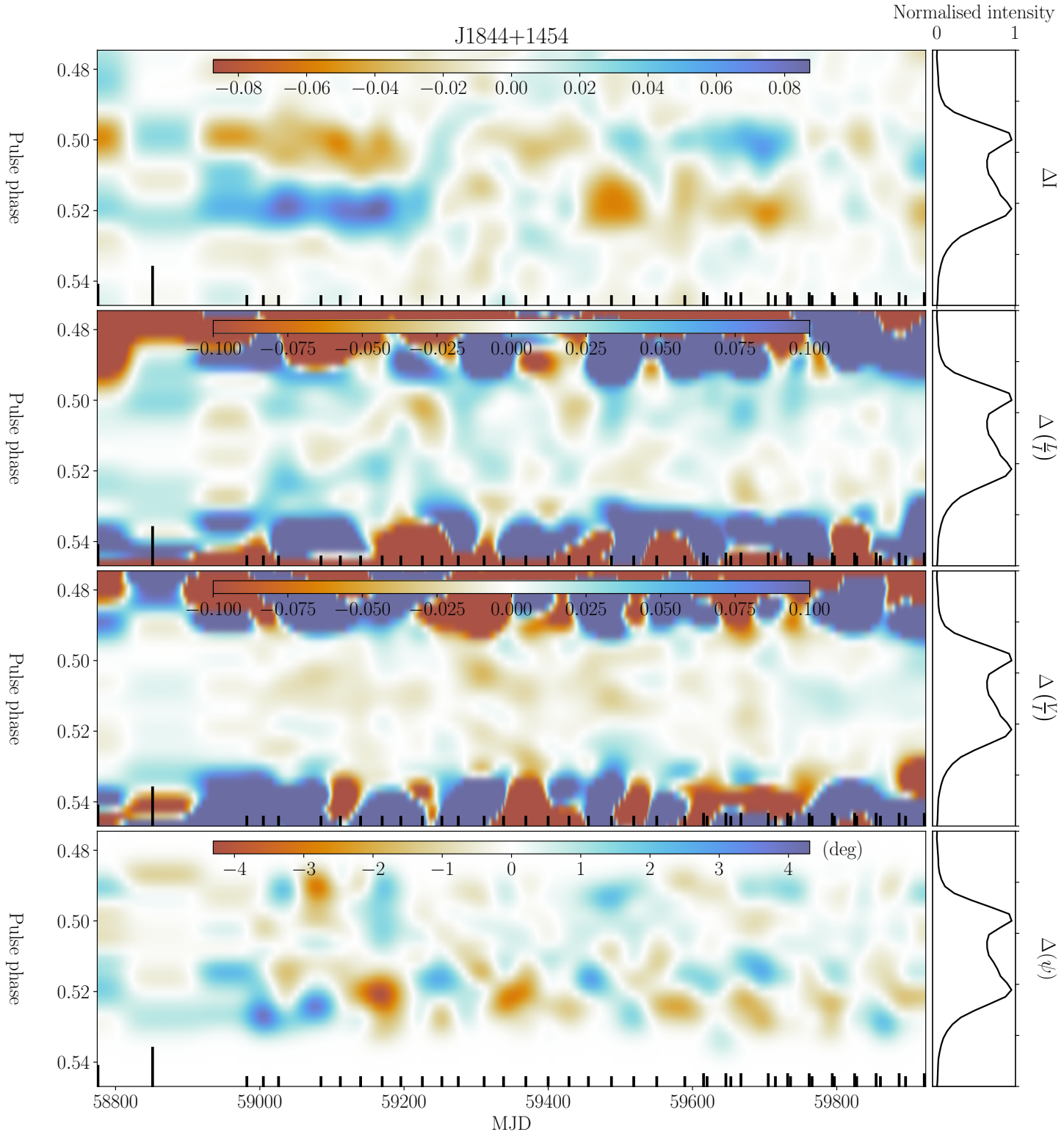


**Figure B16.** This figure conveys the same information as that of Fig.B1 but for PSR J1844+1454.

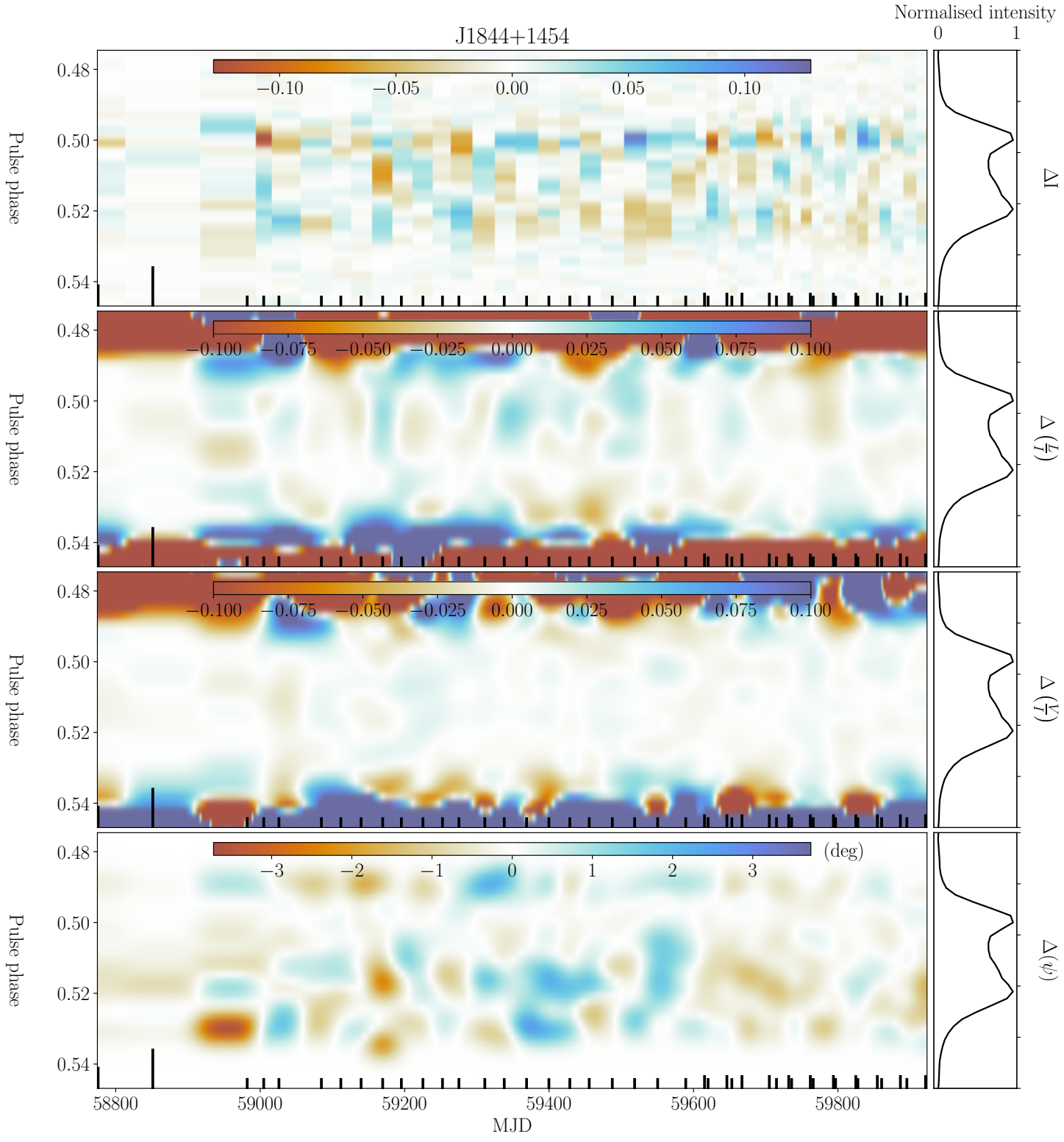


**Figure B17.** The figure captures the same information as shown in Fig. B2 but for PSR J1844+1454.

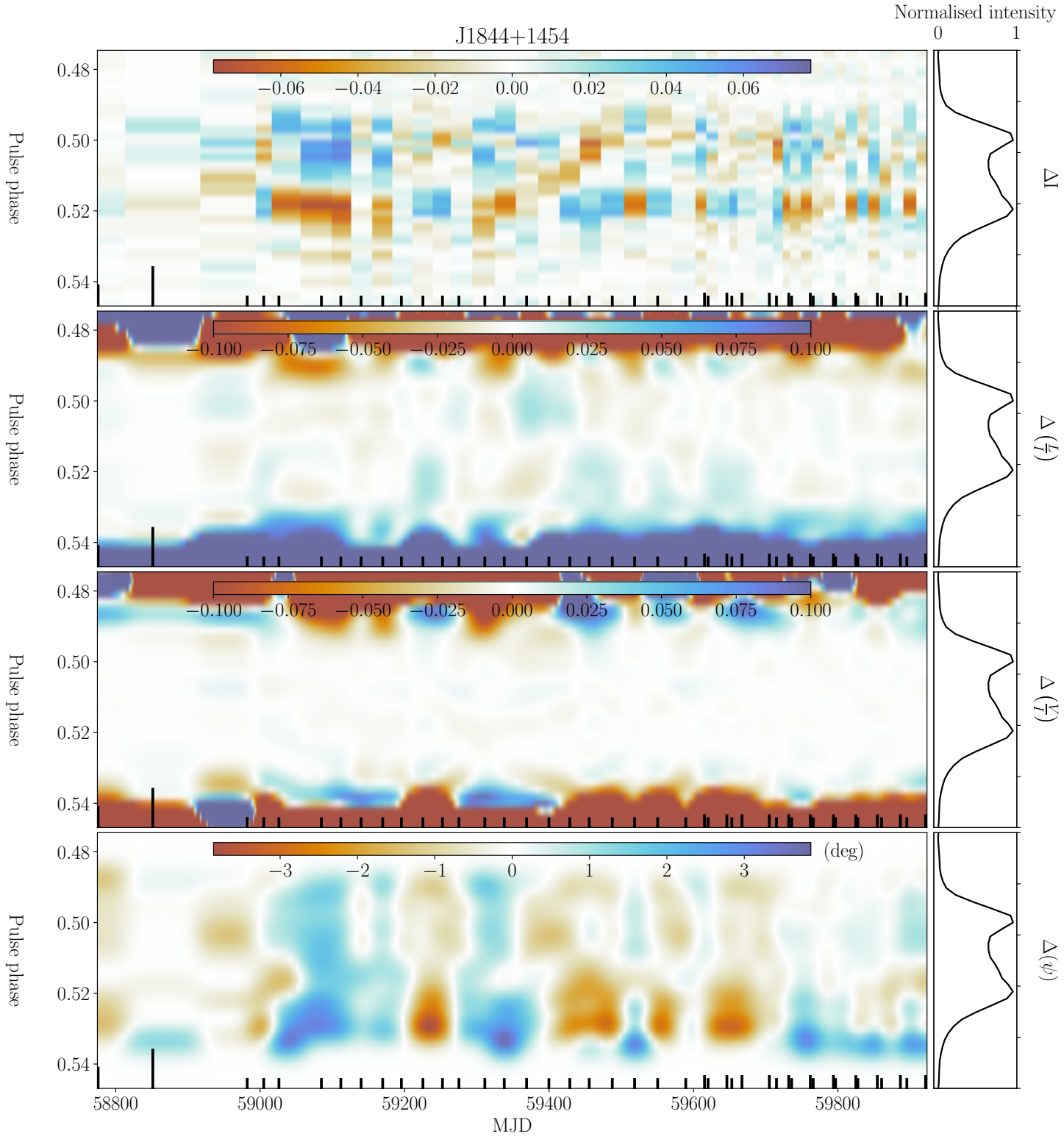


**Figure B18.** The figure captures the same information as shown in Fig. B3 but for PSR J1844+1454.

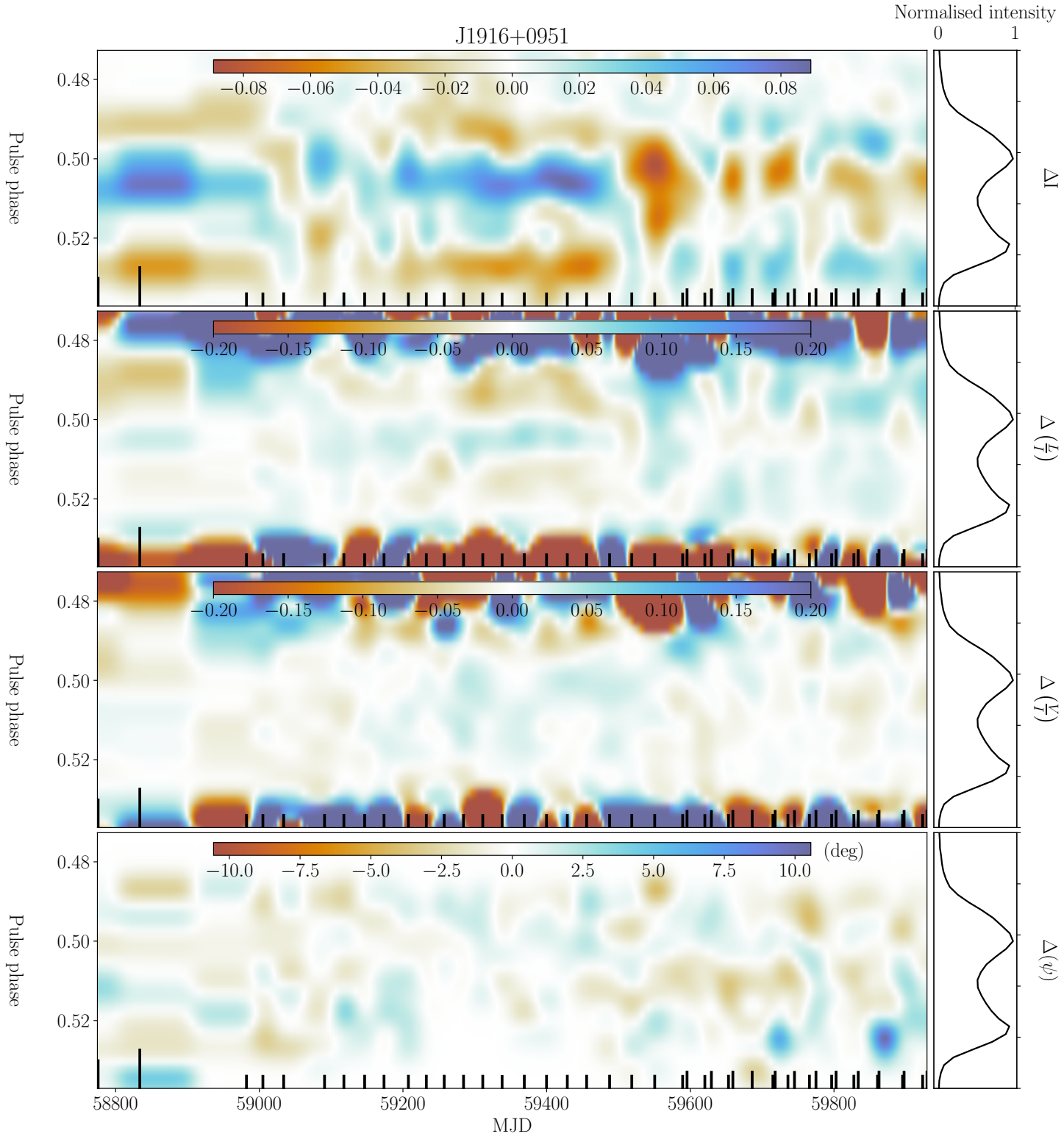


**Figure B19.** This figure conveys the same information as that of Fig.B1 but for PSR J1916+0951.

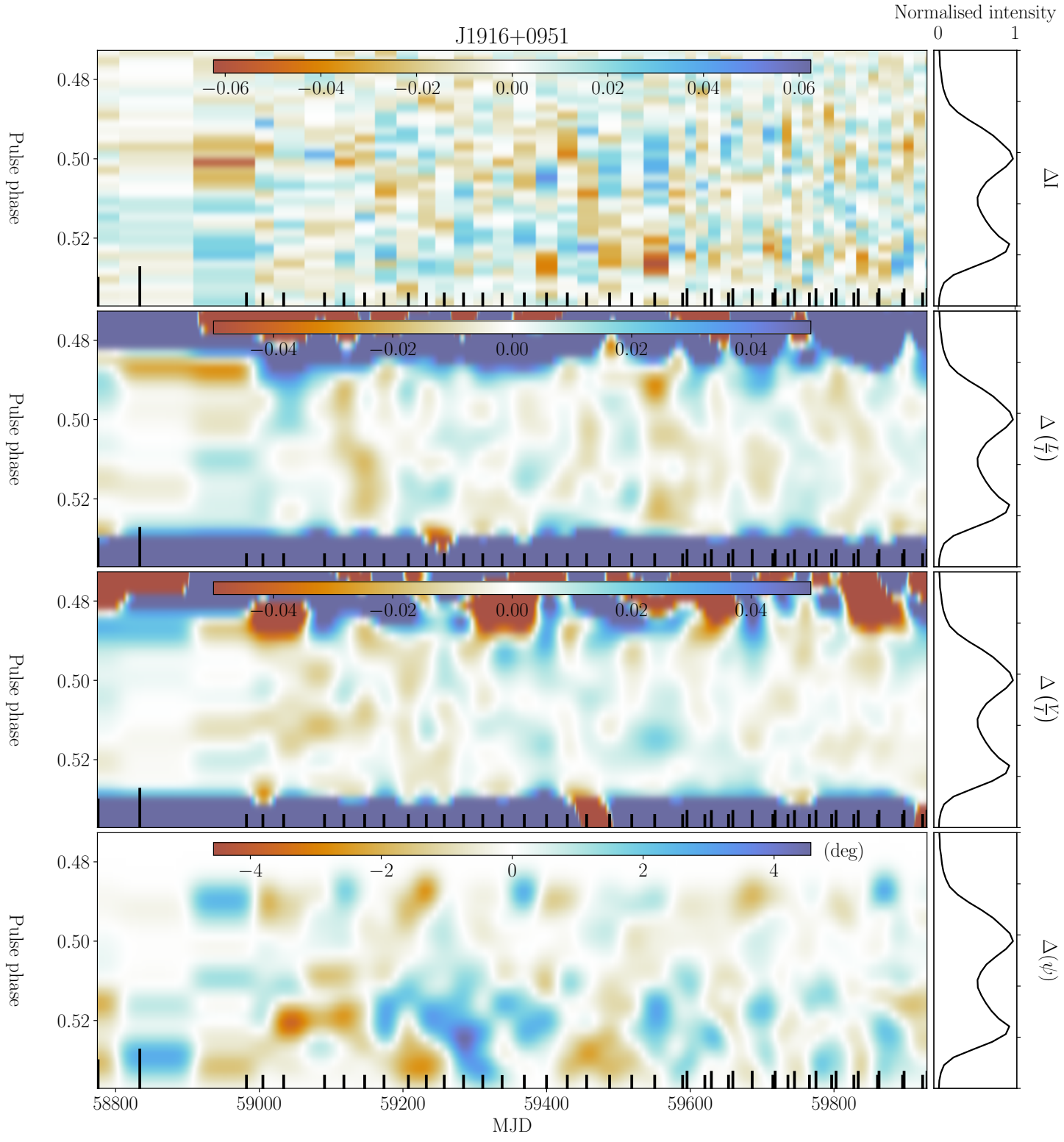


**Figure B20.** The figure captures the same information as shown in Fig. B2 but for PSR J1916+0951.

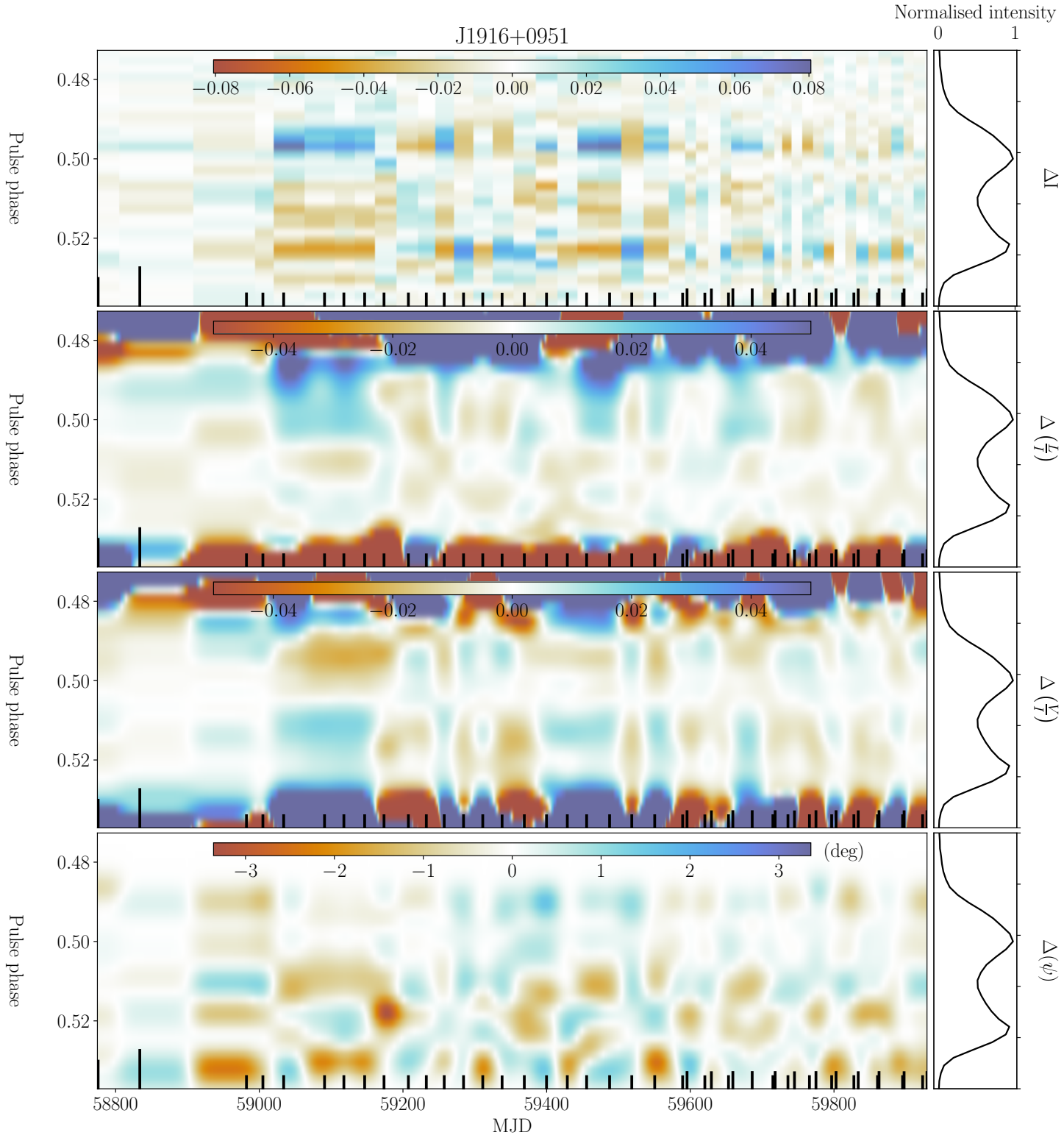


**Figure B21.** The figure captures the same information as shown in Fig. B3 but for PSR J1916+0951.

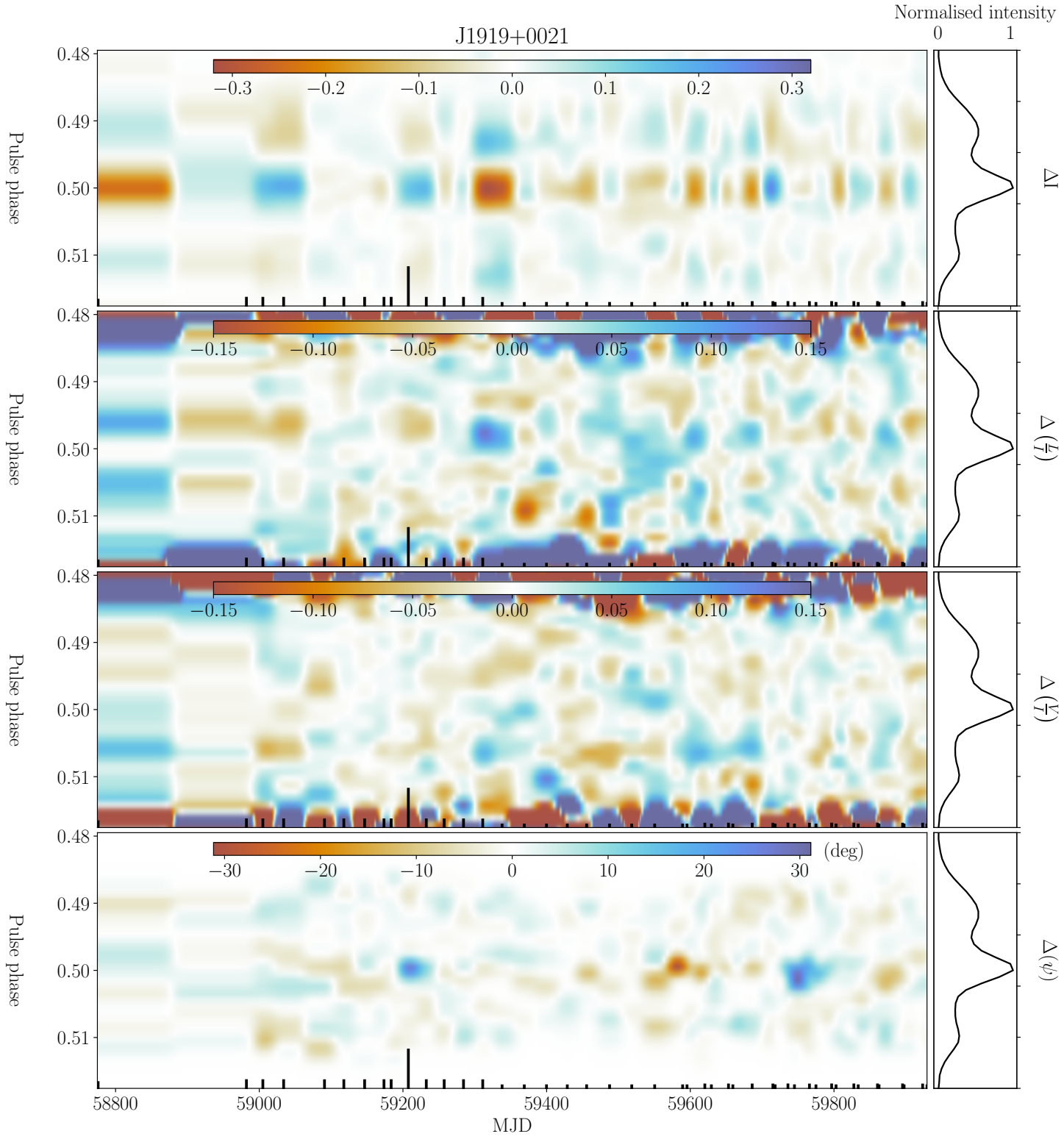


**Figure B22.** This figure conveys the same information as that of Fig.B1 but for PSR J1919+0021.

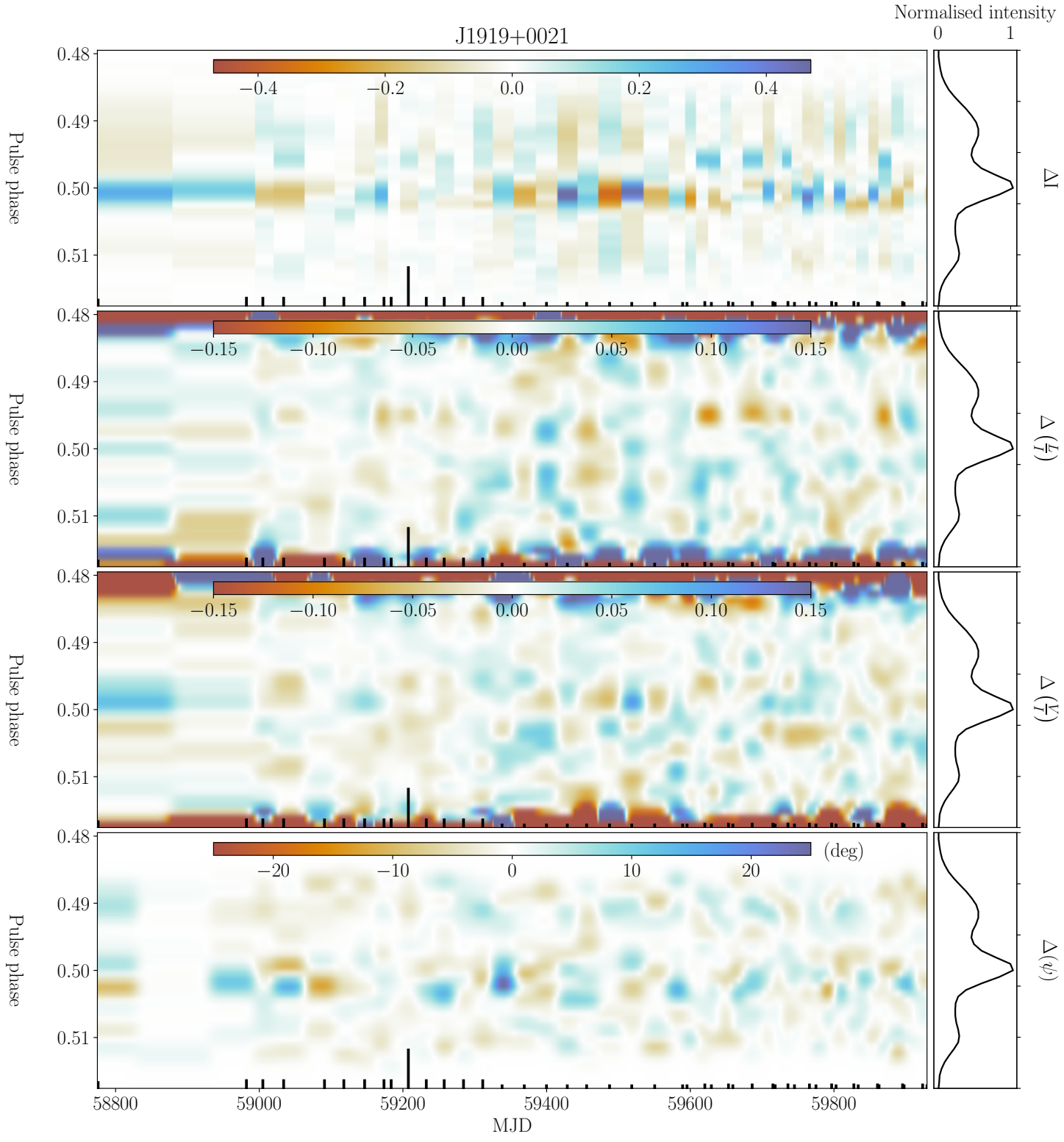


**Figure B23.** The figure captures the same information as shown in Fig. B2 but for PSR J1919+0021.

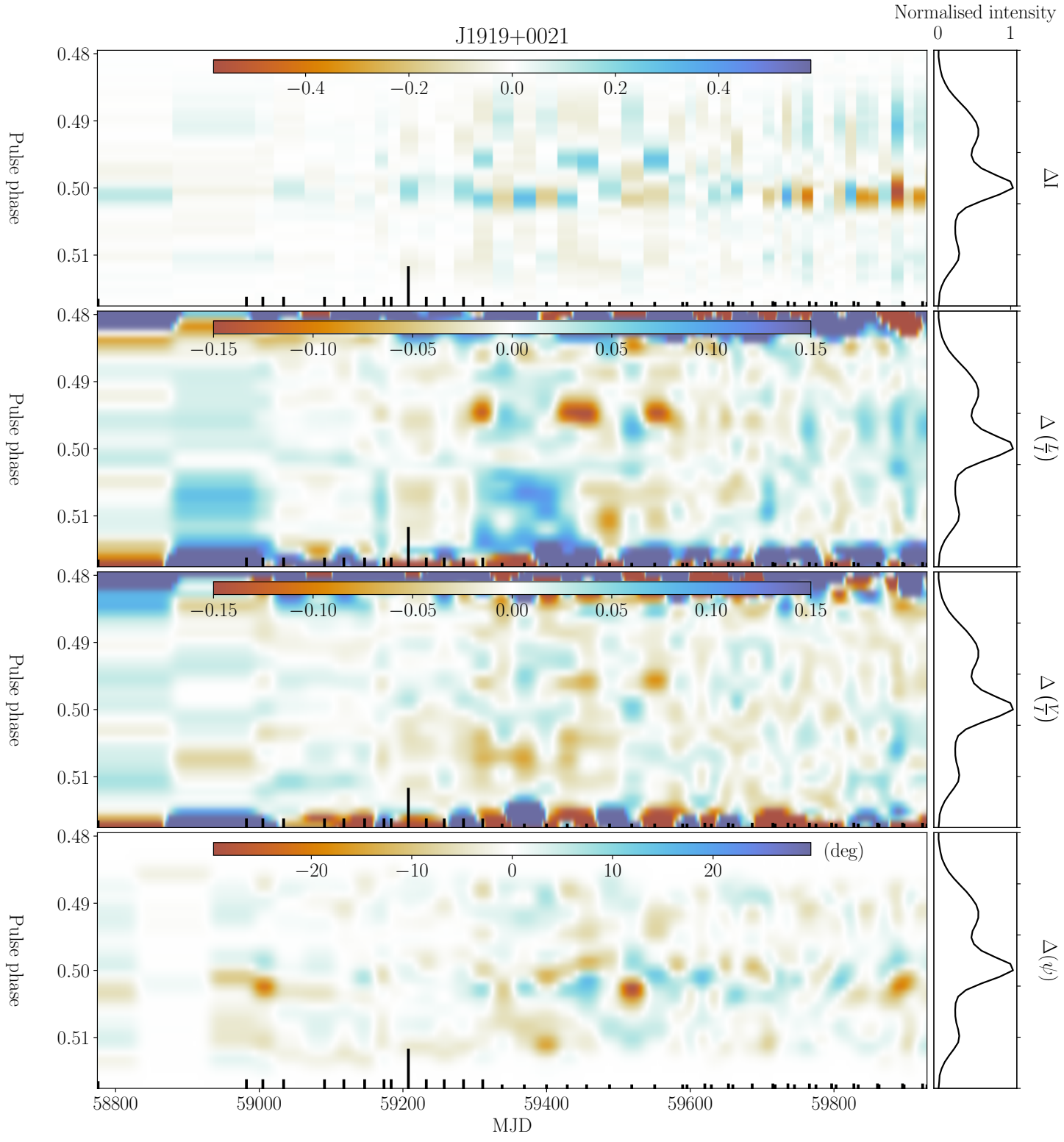


**Figure B24.** The figure captures the same information as shown in Fig. B3 but for PSR J1919+0021.