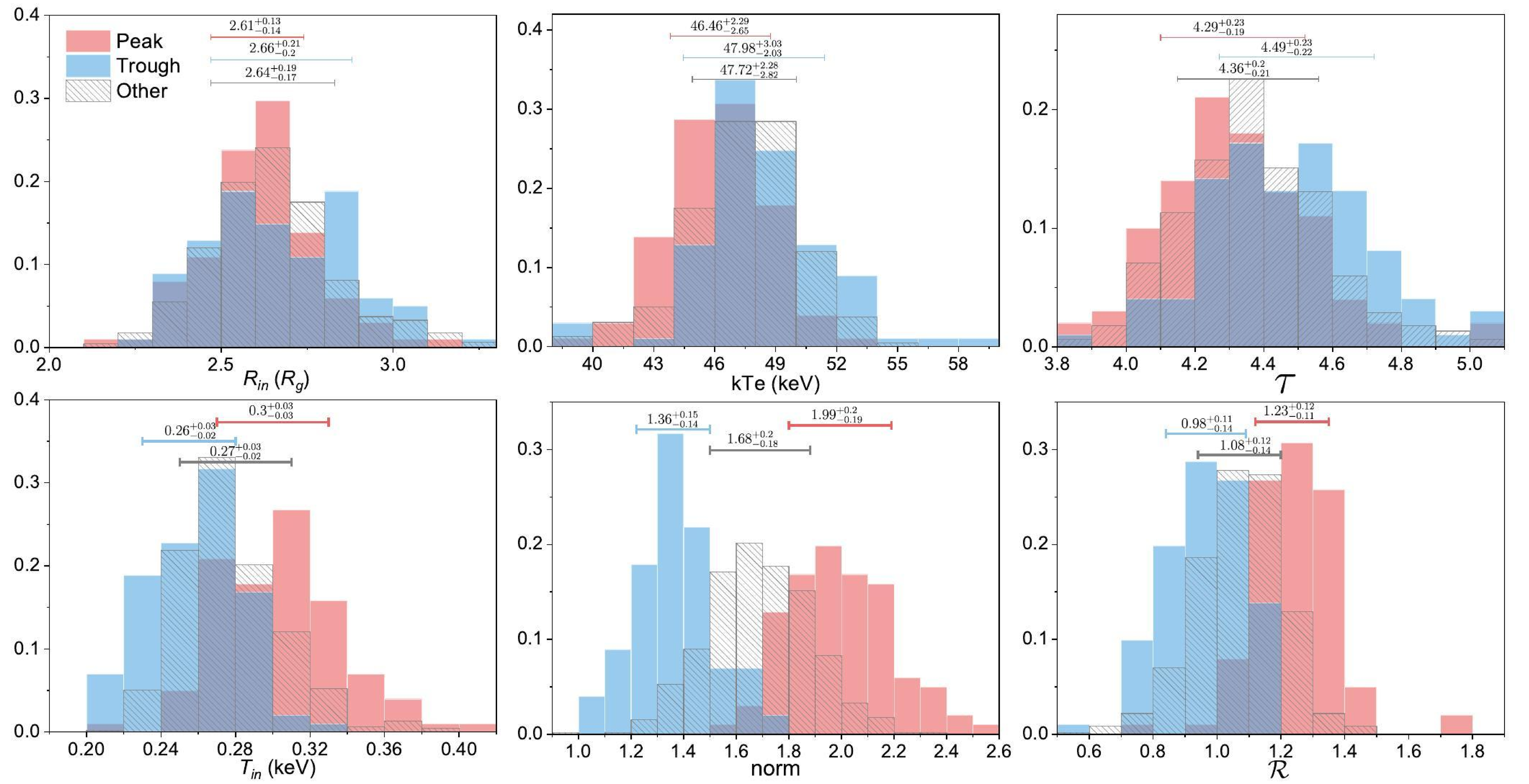

Figure 3. The histogram of the best-fitting parameters of all the X-ray spectra extracted on 5 second time scale. In each graph, the histograms in red represent those spectra during the peak phase, while the histogram in blue represents those spectra during the trough phases, respectively. The histograms of the spectral parameters in neither the peak phase nor the trough phase are shown in shadow. The 68% interval for each parameter in each histogram is marked by a horizontal baa r.

varies. The photon flux variation in the reflection component (R_P-R_T) is roughly two times larger than that of the Compton component below ∼10 keV, and becomes less than 1/2 in the energy range above ∼100 keV. We then plotted the ratio between the photon flux variation of the reflection and the Compton component between the peak phase and the trough phase, in order to show relative contributions from the Compton and the reflection component to the X-ray variability with photon energy. The QPO fractional RMS below ∼10 keV is also larger than that above ∼10 keV (see Figure 4), which suggests that strong variation of the QPO flux at lower energy band is due to the reflection component. Since the photon flux variation of the reflection component is determined by the variation of $norm \times \mathcal{R}$, the dominated role of the reflection component below ∼10 keV on the QPO flux variation can be understood as the parameter $\mathcal{R}$ of this observation is large.

A remarkable result is shown in Figure 4. Starting from above ∼70 keV, the flux variation between the peak phase and the trough phase is becoming primarily from the contribution of the *direct* Compton component. Beyond 100 keV or so, the contribution of the reflection component is negligible. This implies that detection of the LFQPOs at energy above ∼100 keV simply means that the Compton component itself produces the LFQPO quasi-periodicity, although the reflection component dominates the LFQPO peak-trough variation below ∼30 keV.

3 DISCUSSION

We have investigated the short-timescale X-ray spectra corresponding to the high and low intensity phases of the LFQPO (defined as peak and trough) in one *Insight*-HXMT observation of MAXI J1820+070. The greatest change among spectral parameters between the two LFQPO phases is the normalization *norm*. The difference in the normalization represents the flux variation between the two phases in the primary Compton emission. In the energy range above ∼100 keV, the Compton component overwhelmingly dominates over the reflection component, and thus the flux variation above ∼100 between the peak and the trough phases is contributed by the Compton component alone (see Figure 4). Therefore, the underlying beats that generate the LFQPOs should originate from the Compton emission. Under the framework of conventional Comptonization models, the Compton component is thought to originate from a hot corona. Our spectral analysis shows that the corona is not oscillating coronal temperature or electron density, since in our spectral fits, the temperature kT_e and τ of the Compton component does not show apparent changes between those of the peak and the trough phases. Thus the LFQPO corresponds to a modulation in the photon flux of the Compton component, either through modulation of the seed photons or line-of-sight covering factor.

The difference in the reflection fraction $\mathcal{R}$ between the peak and the trough phases demonstrates that the reflection fraction acts like an amplification factor of the variation in the primary incident Compton flux since the photon flux variation in the reflection component is determined by $norm \times \mathcal{R}$. The values of the reflection fraction in the peak and the trough phases are both very large (larger than unity) but different, which causes the flux change between the peak and the trough phases at lower energies (below ∼30 keV, see Figure 4) is dominated by the reflection component. The effect of the reflection fraction is also confirmed by that the fractional rms of the LFQPOs at below ∼10 keV is higher than that above 10 keV. In conclusion, the modulation in the Compton photons produces the underlying,