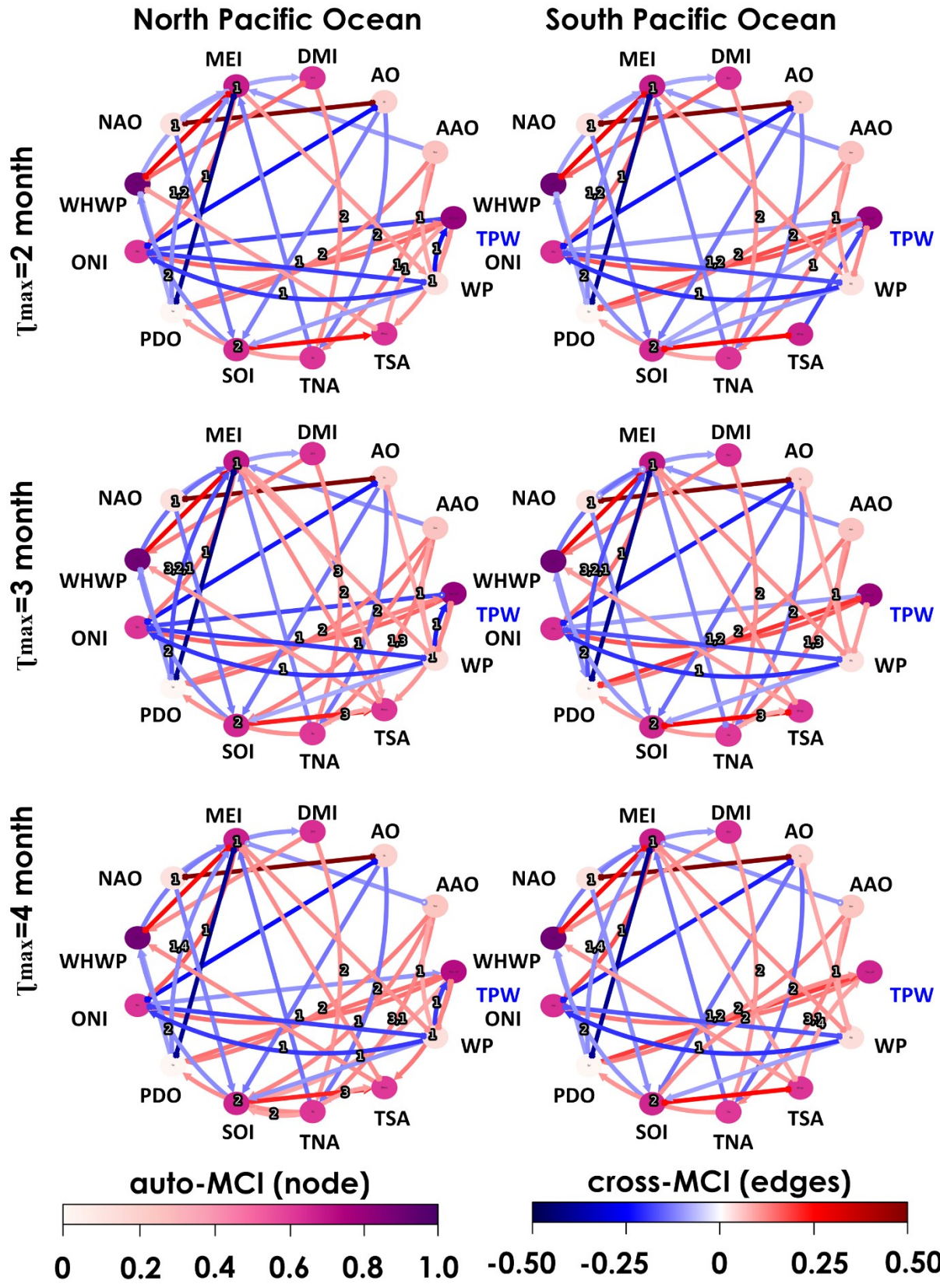


1

2 Fig. S1 Causal graphs of the Atlantic oceanic region, the maximum time delay denoted as  $\tau_{\max}$  in different months,  
 3 alongside the significance threshold  $\alpha=0.1$ .

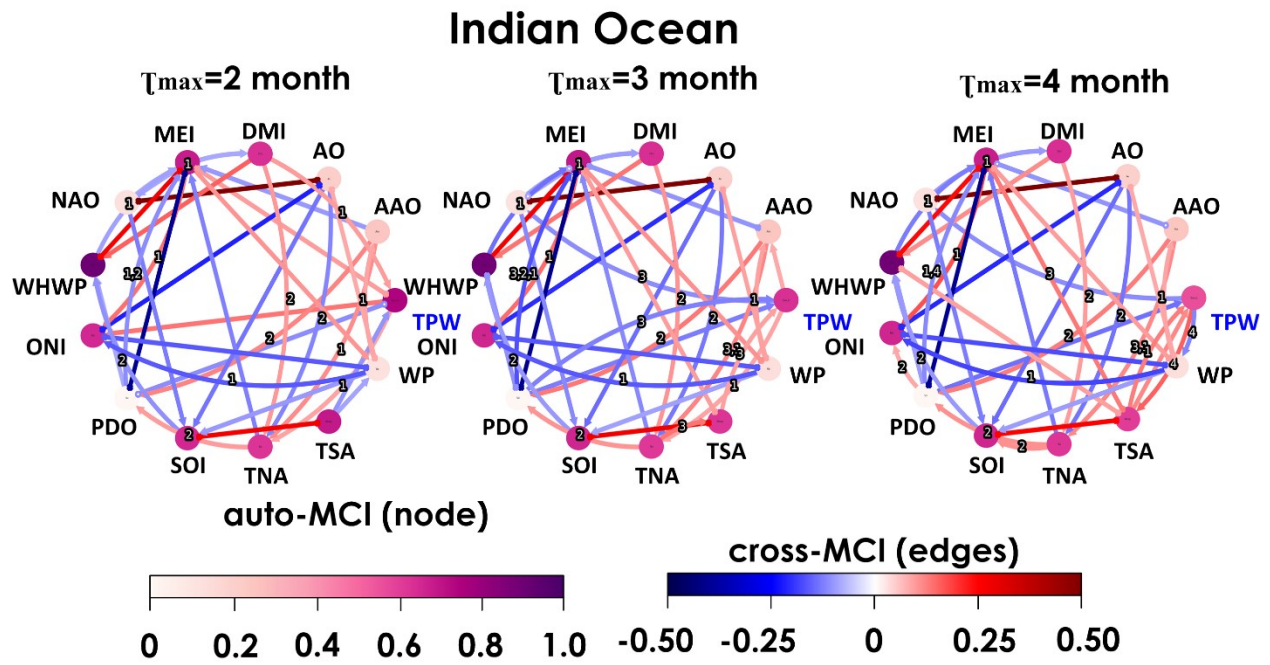


Fig

4

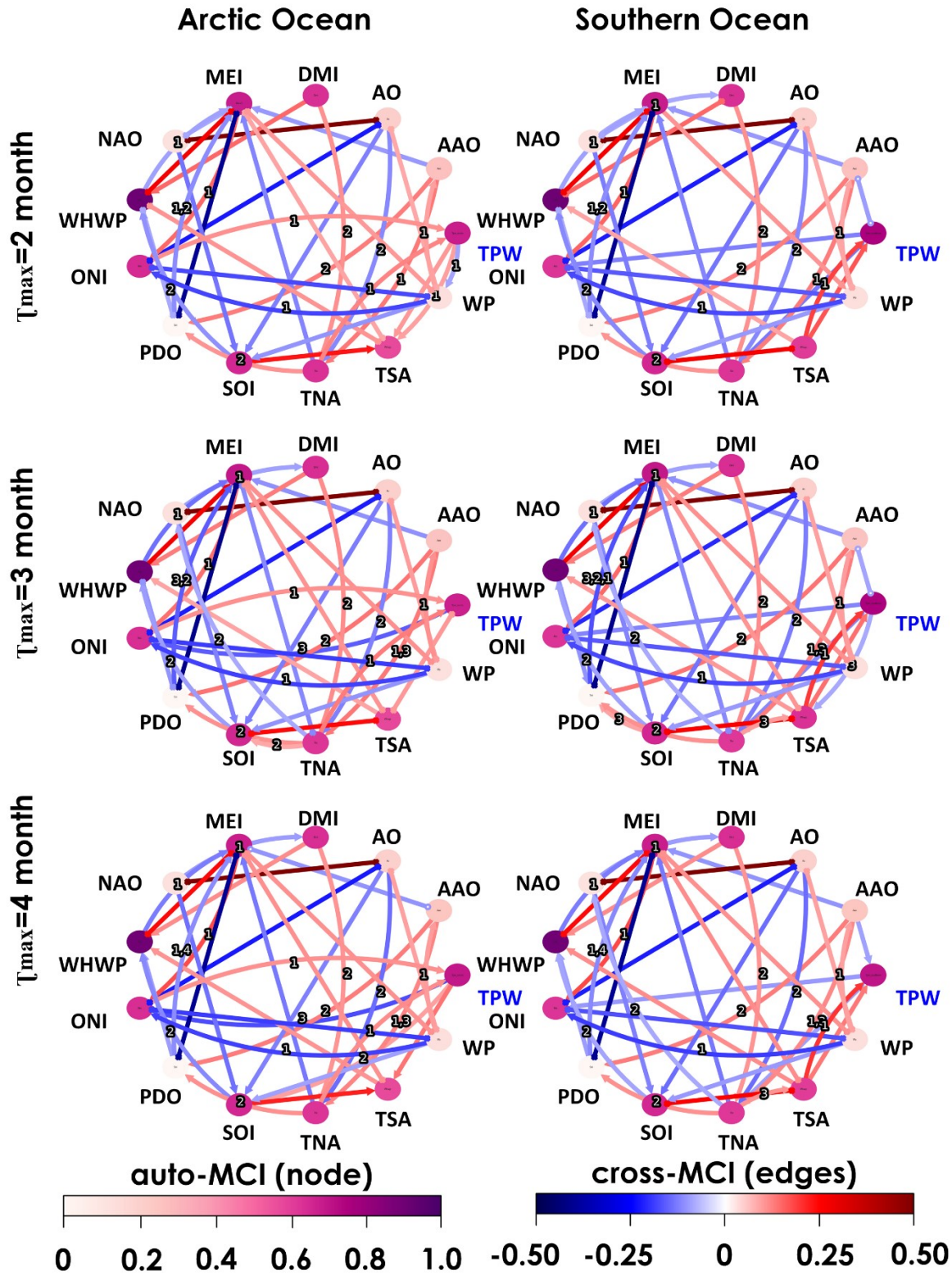
5 . S2 Causal graphs of the Pacific oceanic region, the maximum time delay denoted as  $T_{max}$  in different months,

6 alongside the significance threshold  $\alpha=0.1$ .



7

8 **Fig. S3** Causal graphs of the Indian oceanic region, the maximum time delay denoted as  $\tau_{\max}$  in different months,  
 9 alongside the significance threshold  $\alpha=0.1$ .



11 Fig. S4 Causal graphs of the Polar oceanic region, the maximum time delay denoted as  $T_{\max}$  in different months,  
 12 alongside the significance threshold  $\alpha=0.1$ .