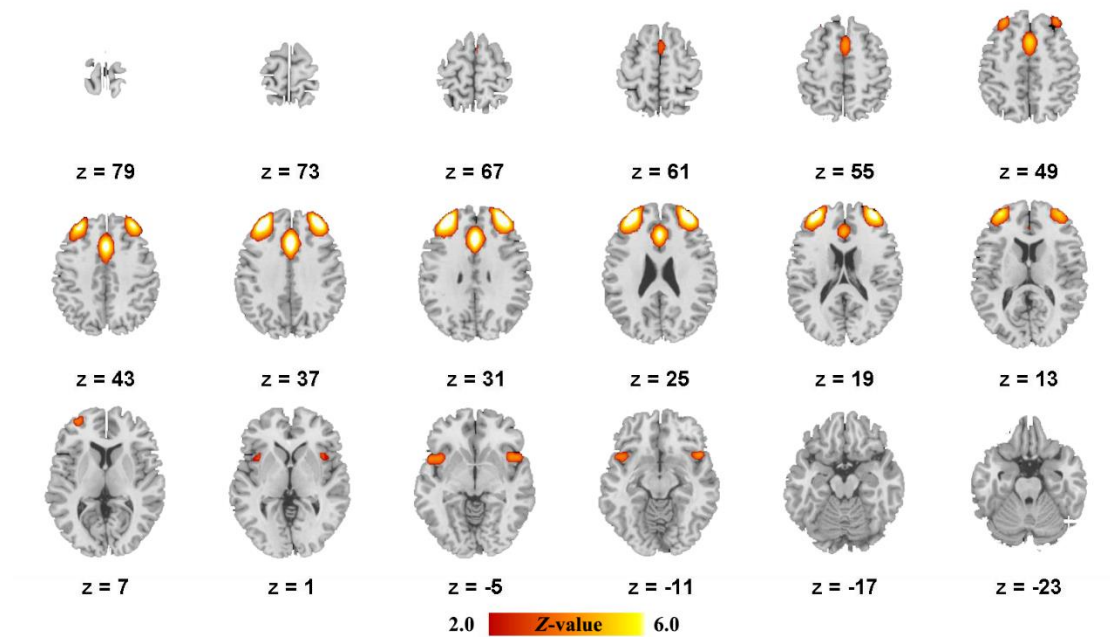
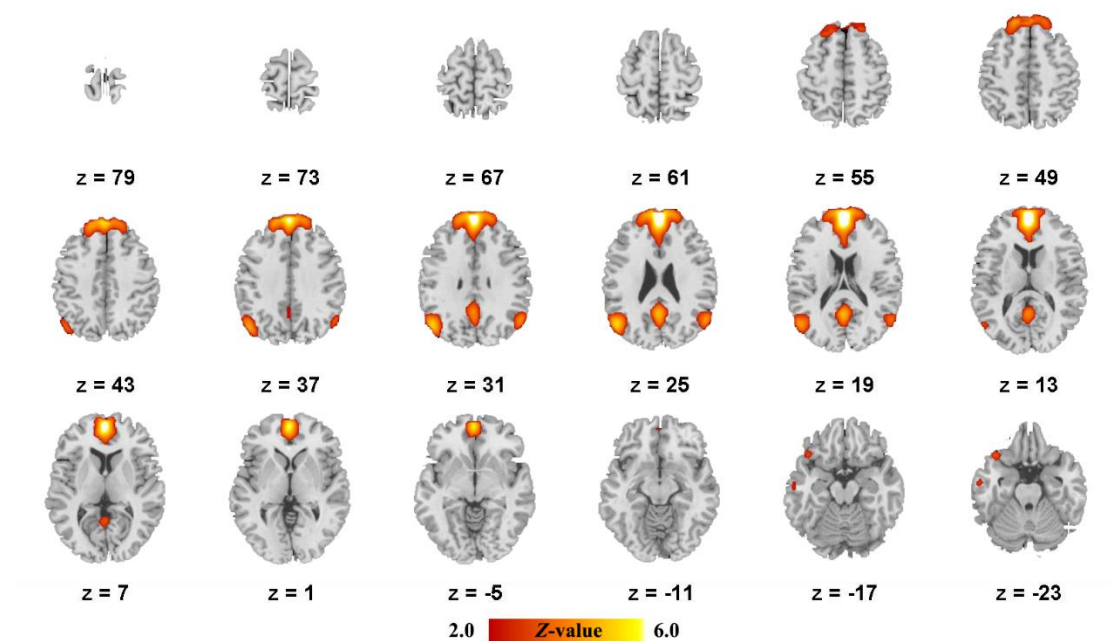
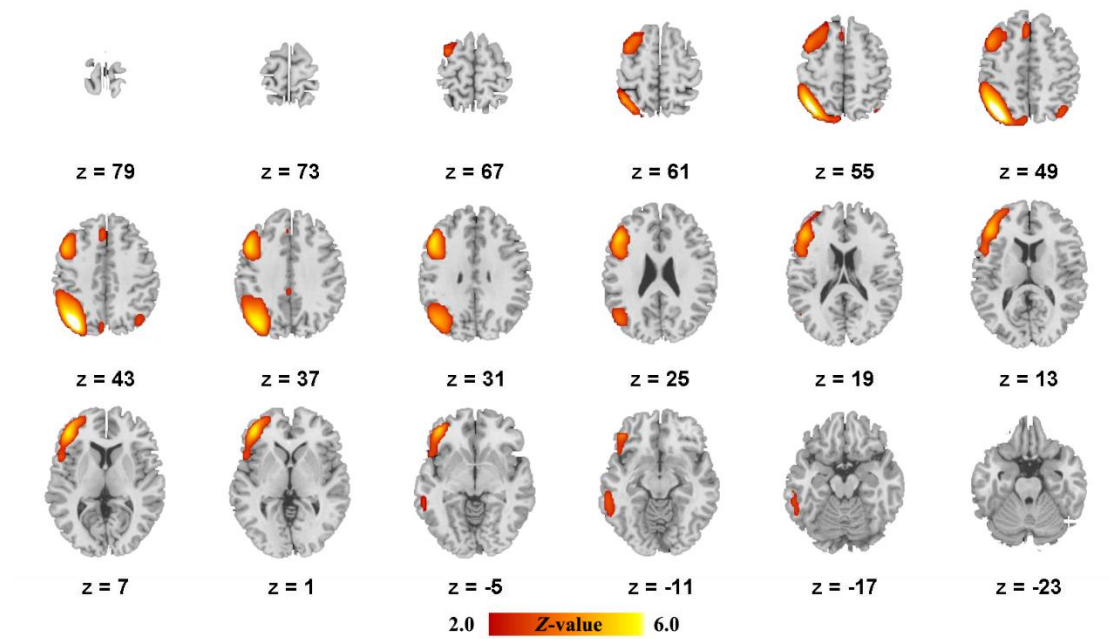




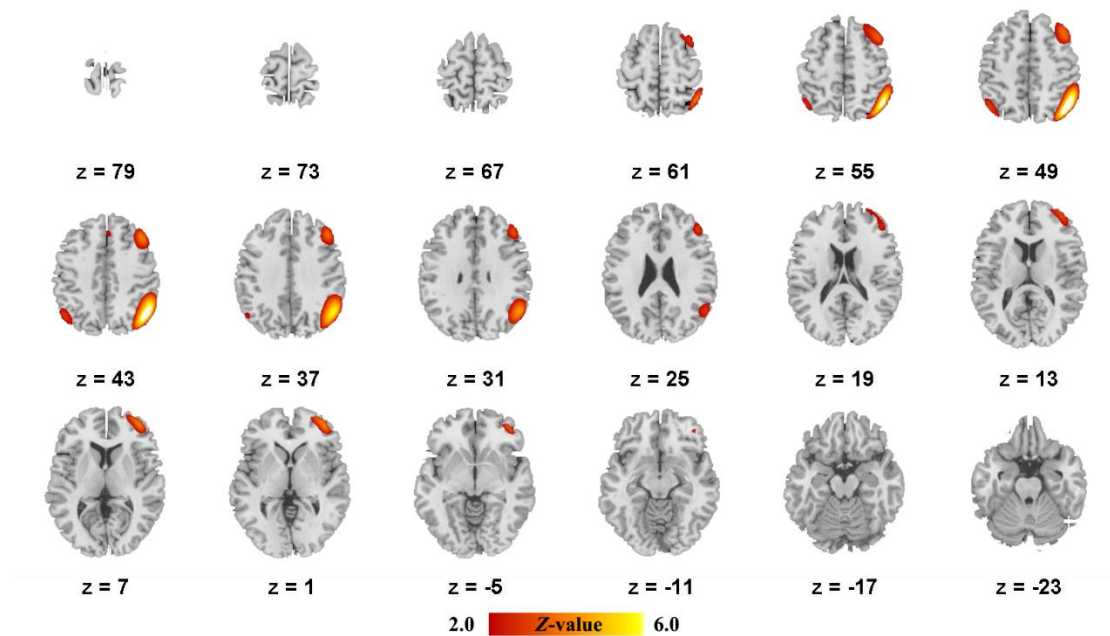
Supplementary Figure 1. Spatial map of the Saliency Network (SN). Key regions include the dorsal anterior cingulate cortex (dACC) and bilateral anterior insula (AI).



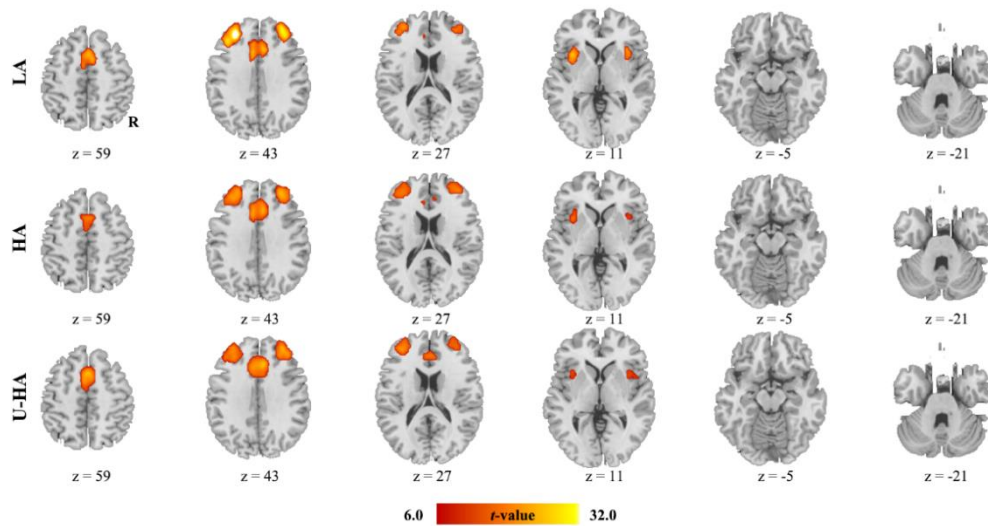
Supplementary Figure 2. Spatial map of the Default Mode Network (DMN). Key regions include the medial prefrontal cortex (mPFC), posterior cingulate cortex/precuneus (PCC/precuneus), and bilateral inferior parietal lobules (IPL).



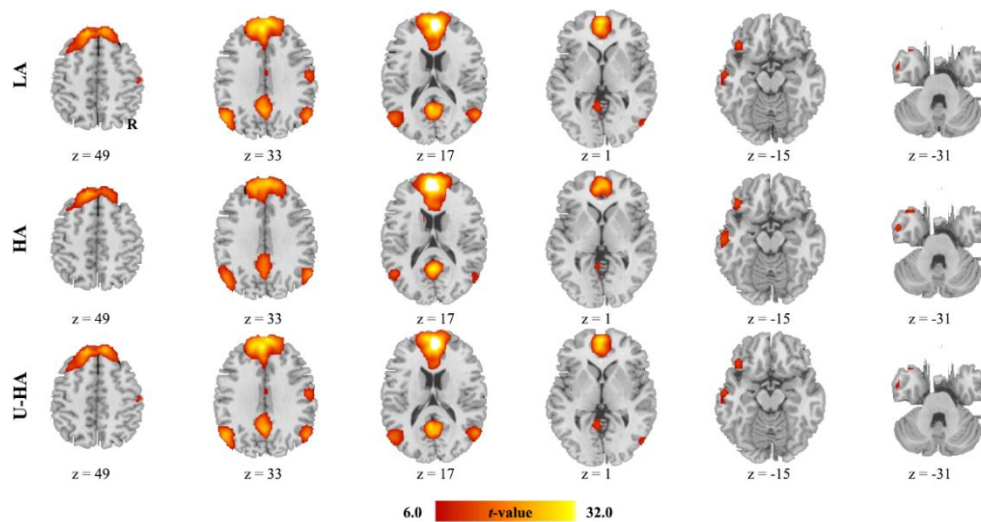
Supplementary Figure 3. Spatial map of the left Executive Control Network (left ECN). Key regions include the left dorsolateral prefrontal cortex (dlPFC) and left posterior parietal cortex (PPC).



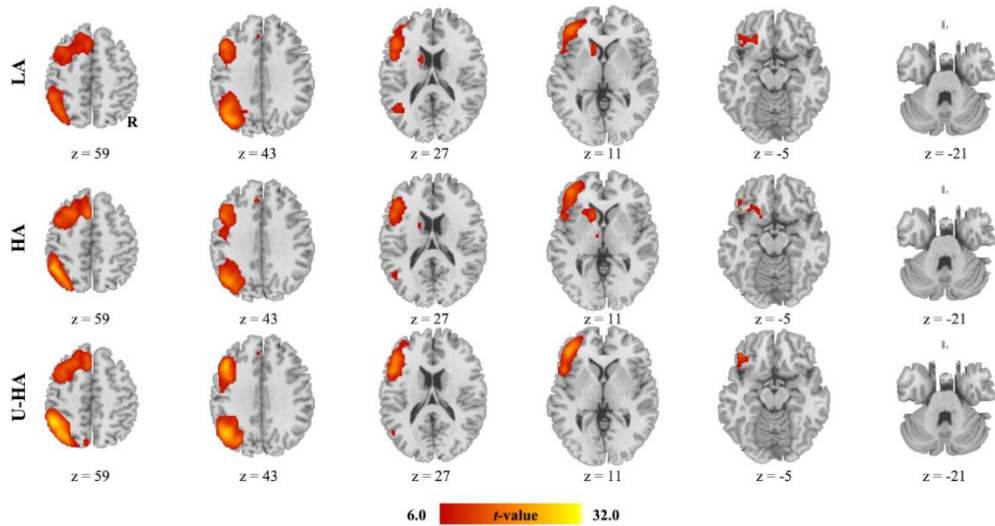
Supplementary Figure 4. Spatial map of the right Executive Control Network (right ECN). Key regions include the right dlPFC and right PPC.



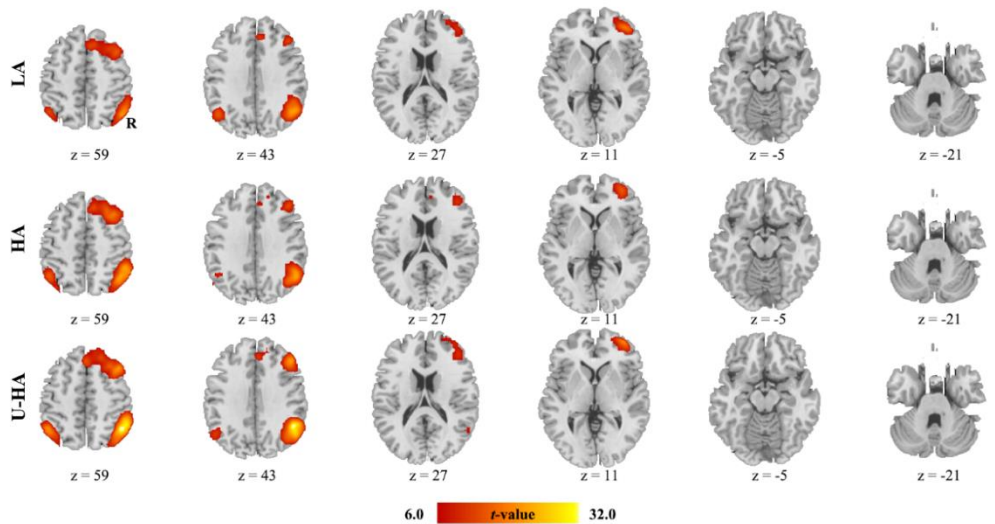
Supplementary Figure 5. Spatial maps of the Salience Network (SN) across altitude groups. The figure displays the group-level spatial patterns of the SN derived from one-sample t-tests within the Low Altitude (LA), High Altitude (HA), and Ultra-High Altitude (U-HA) groups. Statistical maps are thresholded at a voxel-level false discovery rate (FDR) of $q < 0.001$.



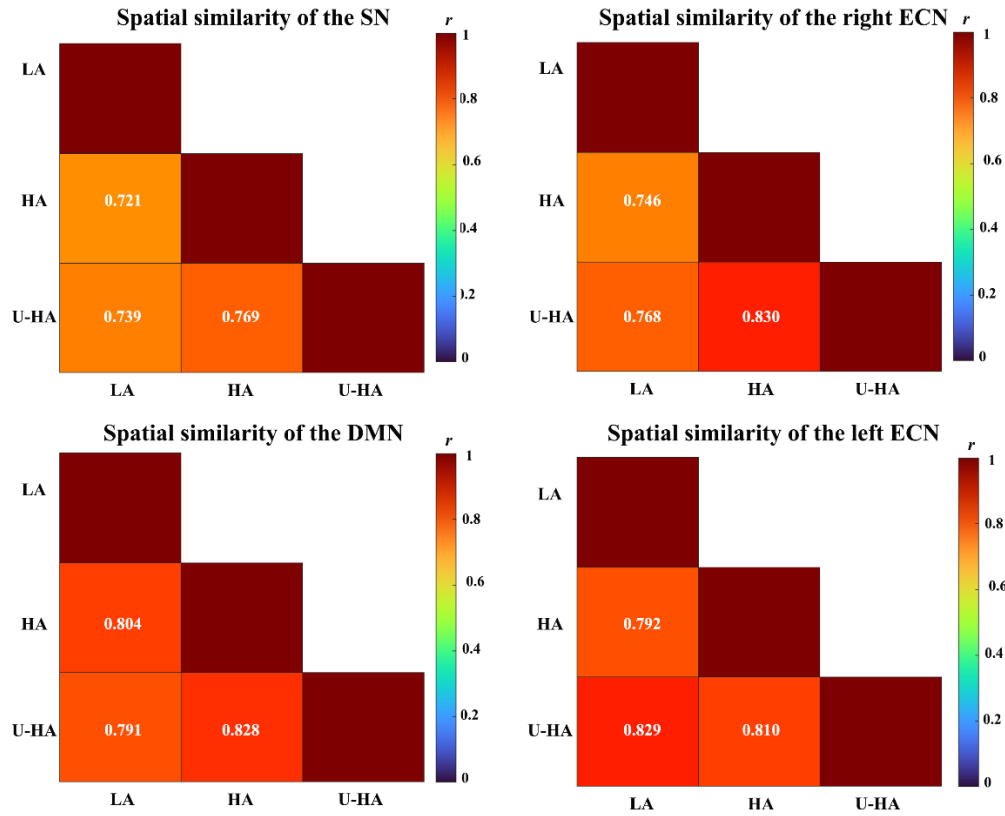
Supplementary Figure 6. Spatial maps of the Default Mode Network (DMN) across altitude groups. The figure displays the group-level spatial patterns of the DMN derived from one-sample t-tests within the Low Altitude (LA), High Altitude (HA), and Ultra-High Altitude (U-HA) groups. Statistical maps are thresholded at a voxel-level false discovery rate (FDR) of $q < 0.001$.



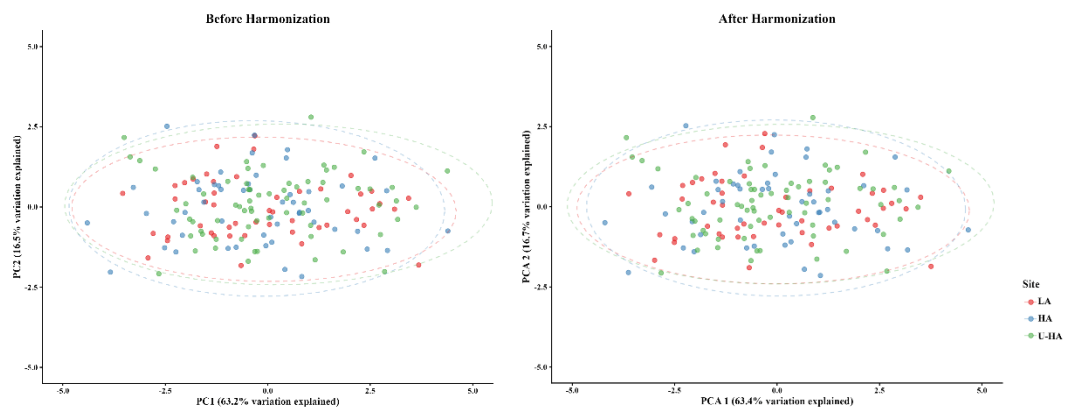
Supplementary Figure 7. Spatial maps of the left Executive Control Network (left ECN) across altitude groups. The figure displays the group-level spatial patterns of the left ECN derived from one-sample t-tests within the Low Altitude (LA), High Altitude (HA), and Ultra-High Altitude (U-HA) groups. Statistical maps are thresholded at a voxel-level false discovery rate (FDR) of $q < 0.001$.



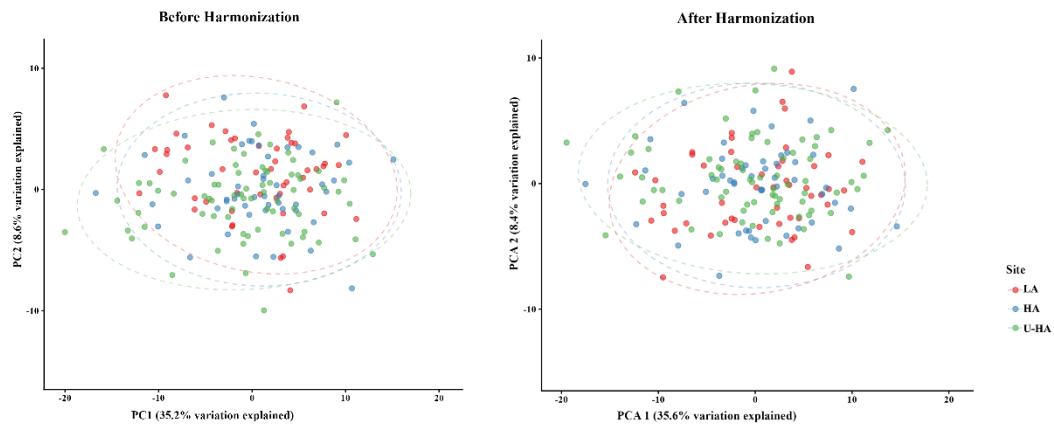
Supplementary Figure 8. Spatial maps of the right Executive Control Network (right ECN) across altitude groups. The figure displays the group-level spatial patterns of the right ECN derived from one-sample t-tests within the Low Altitude (LA), High Altitude (HA), and Ultra-High Altitude (U-HA) groups. Statistical maps are thresholded at a voxel-level false discovery rate (FDR) of $q < 0.001$.



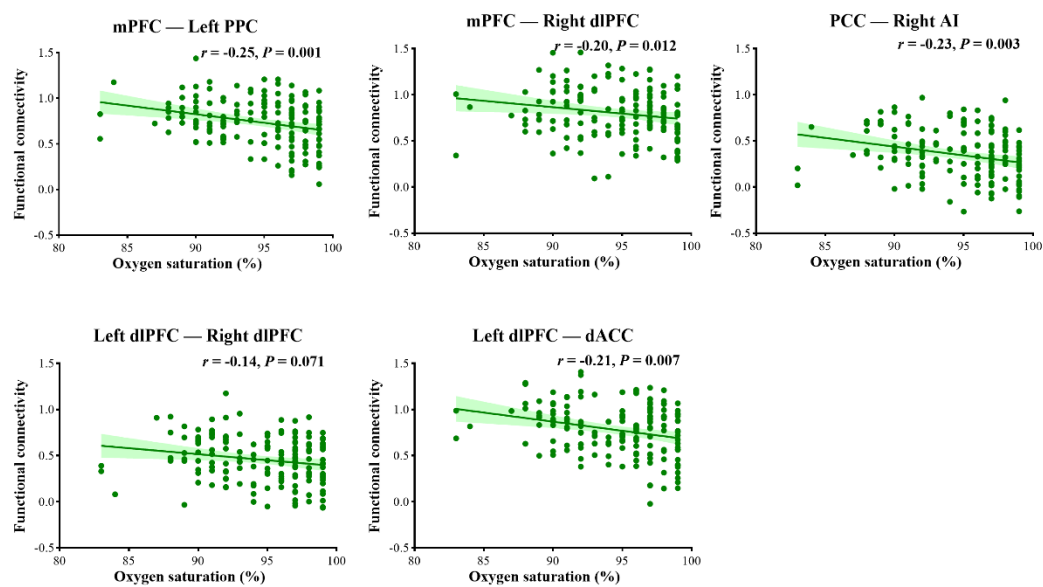
Supplementary Figure 9. Spatial similarity of core large-scale brain networks among the Low Altitude (LA), High Altitude (HA), and Ultra-High Altitude (U-HA) groups.



Supplementary Figure 10. Scatter plots of the first two principal components from the network-level analysis.



Supplementary Figure 11. Scatter plots of the first two principal components from brain level analysis.



Supplementary Figure 12. Scatter plots of the correlation between blood oxygen saturation and functional connectivity prior to outlier removal.

Supplementary Table 1. Results of one-way ANOVA for head motion parameters across altitude groups.

Motion Metric	LA (<i>n</i> =49)	HA (<i>n</i> =51)	U-HA (<i>n</i> =64)	<i>F</i>	<i>P</i>
Maximum translation (Tx, mm)	0.171 ± 0.132	0.229 ± 0.200	0.219 ± 0.163	1.74	0.179
Maximum translation (Ty, mm)	0.358 ± 0.282	0.269 ± 0.247	0.307 ± 0.230	1.581	0.209
Maximum translation (Tz, mm)	0.526 ± 0.336	0.647 ± 0.337	0.655 ± 0.379	2.201	0.114
Maximum rotation (Rx, °)	0.591 ± 0.364	0.745 ± 0.473	0.719 ± 0.467	1.796	0.169
Maximum rotation (Ry, °)	0.275 ± 0.187	0.342 ± 0.462	0.352 ± 0.297	0.842	0.433
Maximum rotation (Rz, °)	0.224 ± 0.161	0.411 ± 0.628	0.366 ± 0.285	3.052	0.05
Number of frames with FD > 0.5 mm	2.71 ± 4.87	4.18 ± 8.34	2.76 ± 4.17	1.061	0.348
Percentage of frames with FD > 0.5 mm (%)	1.51 ± 2.71	2.32 ± 4.63	1.53 ± 2.32	1.061	0.348
Number of frames with FD > 0.2 mm	18.16 ± 20.57	17.47 ± 22.73	22.04 ± 23.26	0.756	0.471
Percentage of frames with FD > 0.2 mm (%)	10.09 ± 11.43	9.71 ± 12.63	12.25 ± 12.92	0.756	0.471

FD, Framewise displacement. LA, Low altitude. HA, High altitude. U-HA, Ultra-high altitude.

Supplementary Table 2. Correlations between functional connectivity measures and altitude exposure duration, depression, anxiety and age.

Functional Connectivity	Altitude exposure duration r (p)	Depression scores r (p)	Anxiety scores r (p)	Age r (p)
mPFC-Left PPC	−0.07 (0.437)	0.04 (0.627)	0.07 (0.408)	0.13 (0.112)
mPFC-Right dlPFC	0.05 (0.639)	−0.04 (0.627)	0.02 (0.850)	0.02 (0.805)
PCC-Right AI	−0.07 (0.452)	0.03 (0.703)	0.13 (0.108)	0.11 (0.145)
Left dlPFC-Right dlPFC	0.03 (0.740)	−0.11 (0.171)	−0.07 (0.388)	0.12 (0.139)
Left dlPFC-dACC	0.23 (0.014)	−0.01 (0.868)	−0.05 (0.543)	0.18 (0.023)