

Fig.1 Spatial distribution of the elevation, meteorological stations (a) and land cover types (b) over northern China. The inset graph shows the proportion of each land cover type. Changed areas are extracted based on maps of the land cover type in 2000 and 2015, respectively.

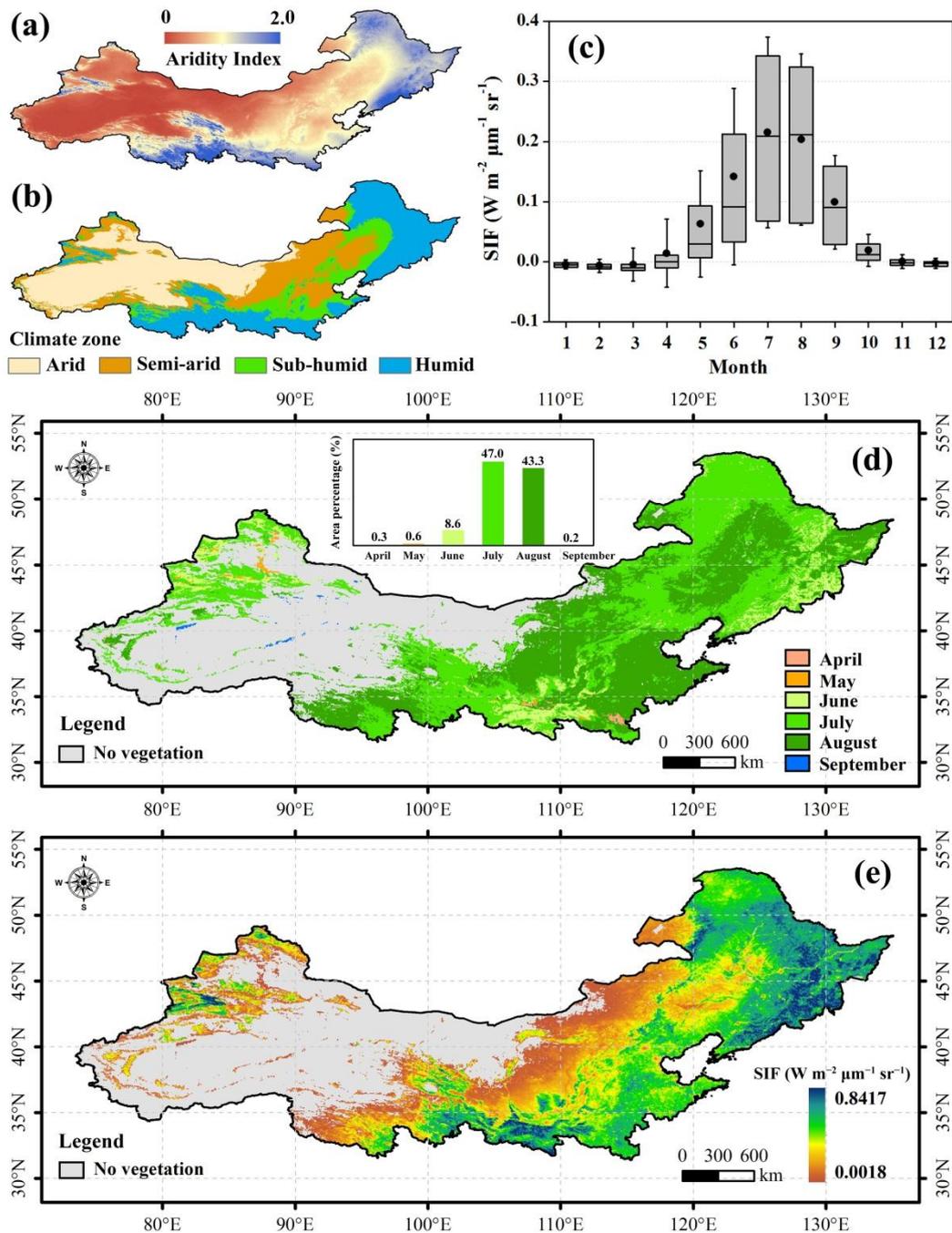


Fig.2 Spatial distribution of the aridity index (a) and aridity category (b) over northern China. The variation of spatially averaged SIF in each month (c). Boxplot elements: Box = Values of 25th and 75th percentiles; Horizontal line = Median; Dot = Mean; Whiskers = ± 1 SD. Spatial distribution of the month with annual maximum SIF (d). The inset graph shows the proportion of each month in which annual maximum SIF appears. Multi-year distribution of the annual maximum SIF (e). No vegetation denotes annual maximum SIF = $0 \text{ W m}^{-2} \mu\text{m}^{-1} \text{sr}^{-1}$ during the period of 2000 to 2017.

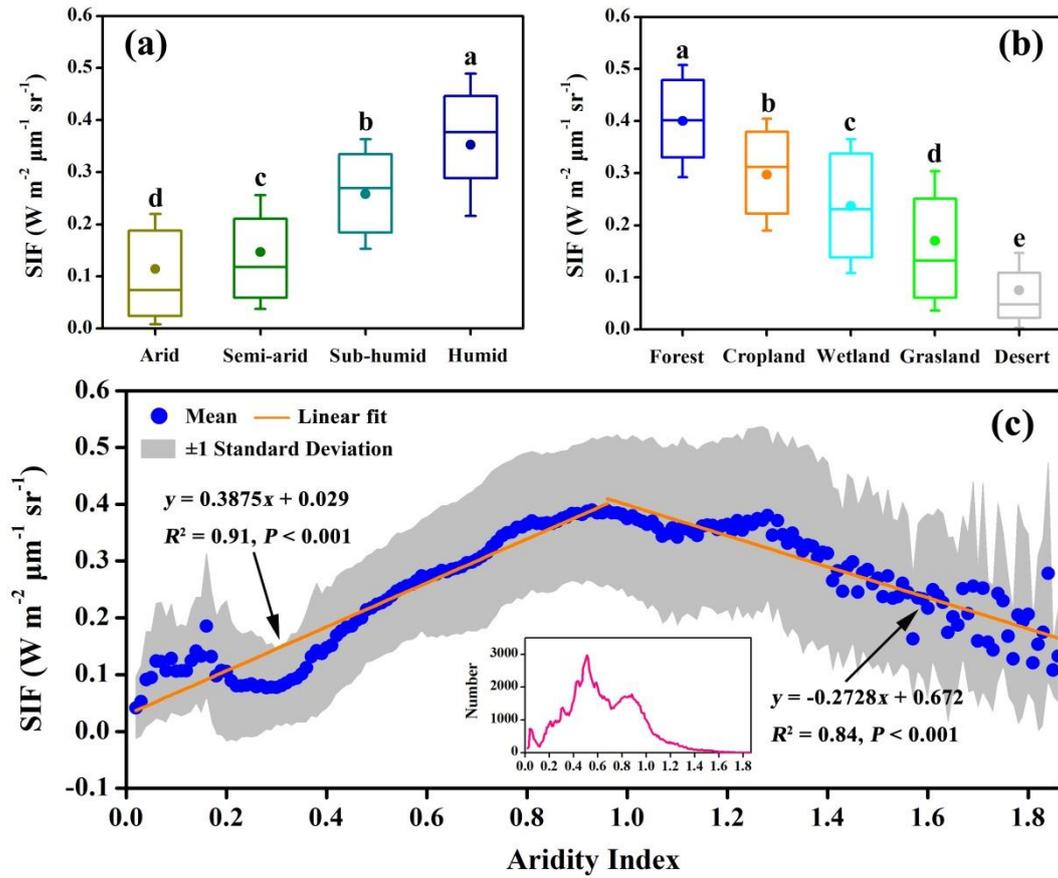


Fig.3 The annual maximum SIF for different aridity categories (a) and biome types (b). The different letter shows significant differences among groups by using the Kruskal-Wallis test. Boxplot elements: Box = Values of 25th and 75th percentiles; Horizontal line = Median; Dot = Mean; Whiskers = ± 1 SD. The variation of annual maximum SIF with increasing wetness (c). The inset graph shows the number of observations in every aridity index bin.

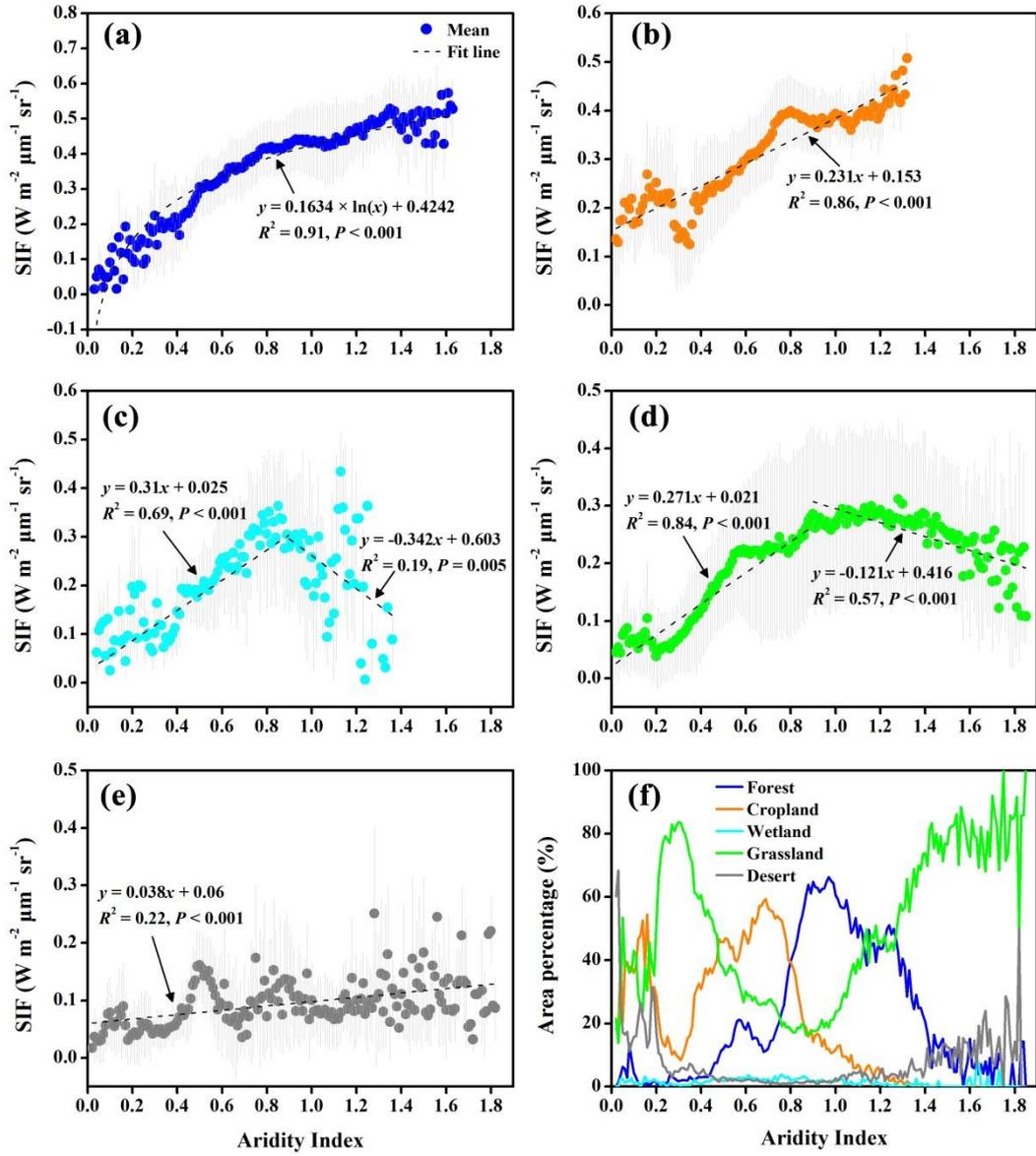


Fig.4 The variation of annual maximum SIF with increasing aridity index in different biomes (a. forest, b. cropland, c. wetland, d. grassland, e. desert). Dots and grey vertical lines denote mean and ± 1 SD, respectively. The proportion of each biome in every aridity index bin (f).

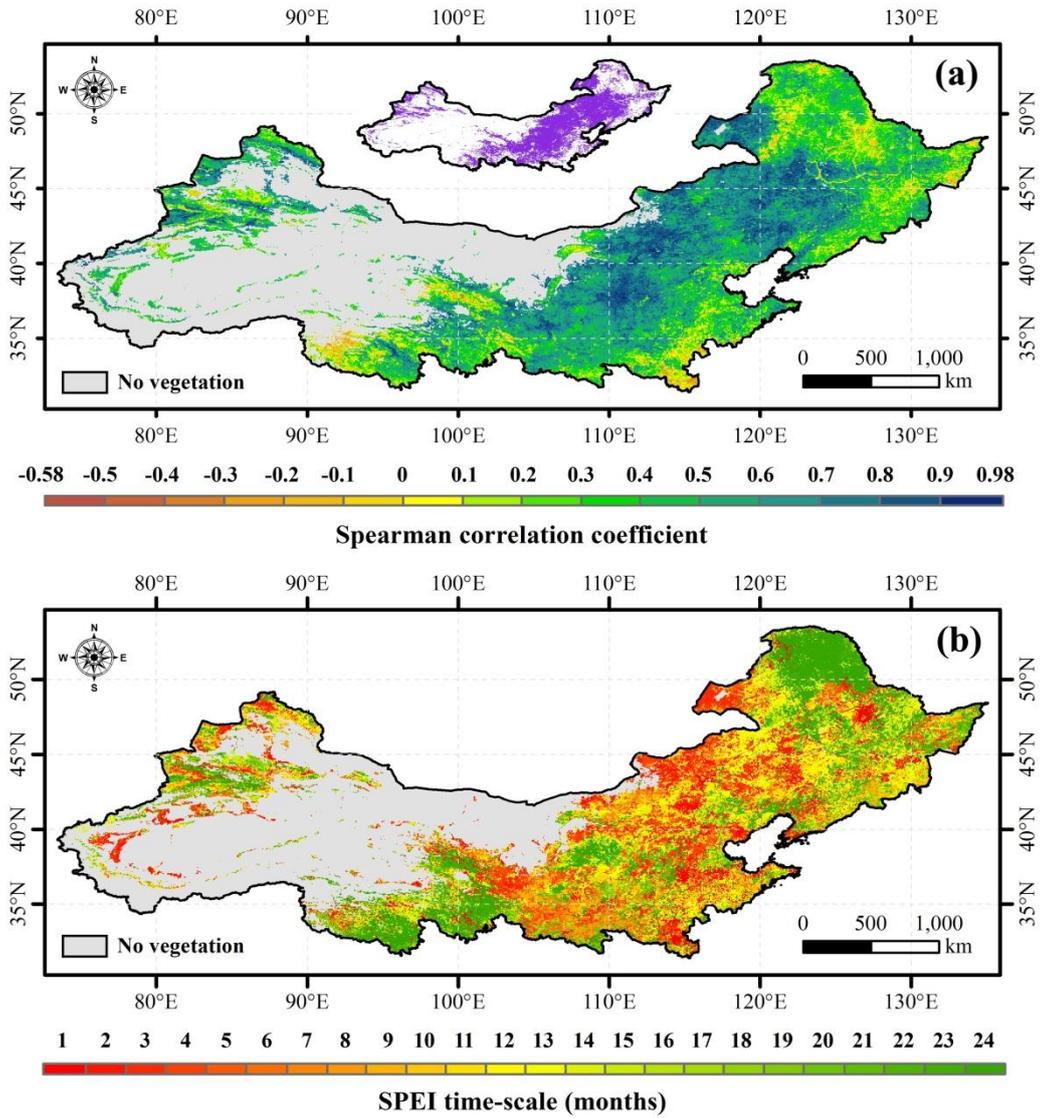


Fig.5 Spatial distribution of the highest correlation between SIF and SPEI (a), and the drought time-scale (b) over northern China. The inset graph shows the area with significant SIF-SPEI correlations ($P < 0.05$).

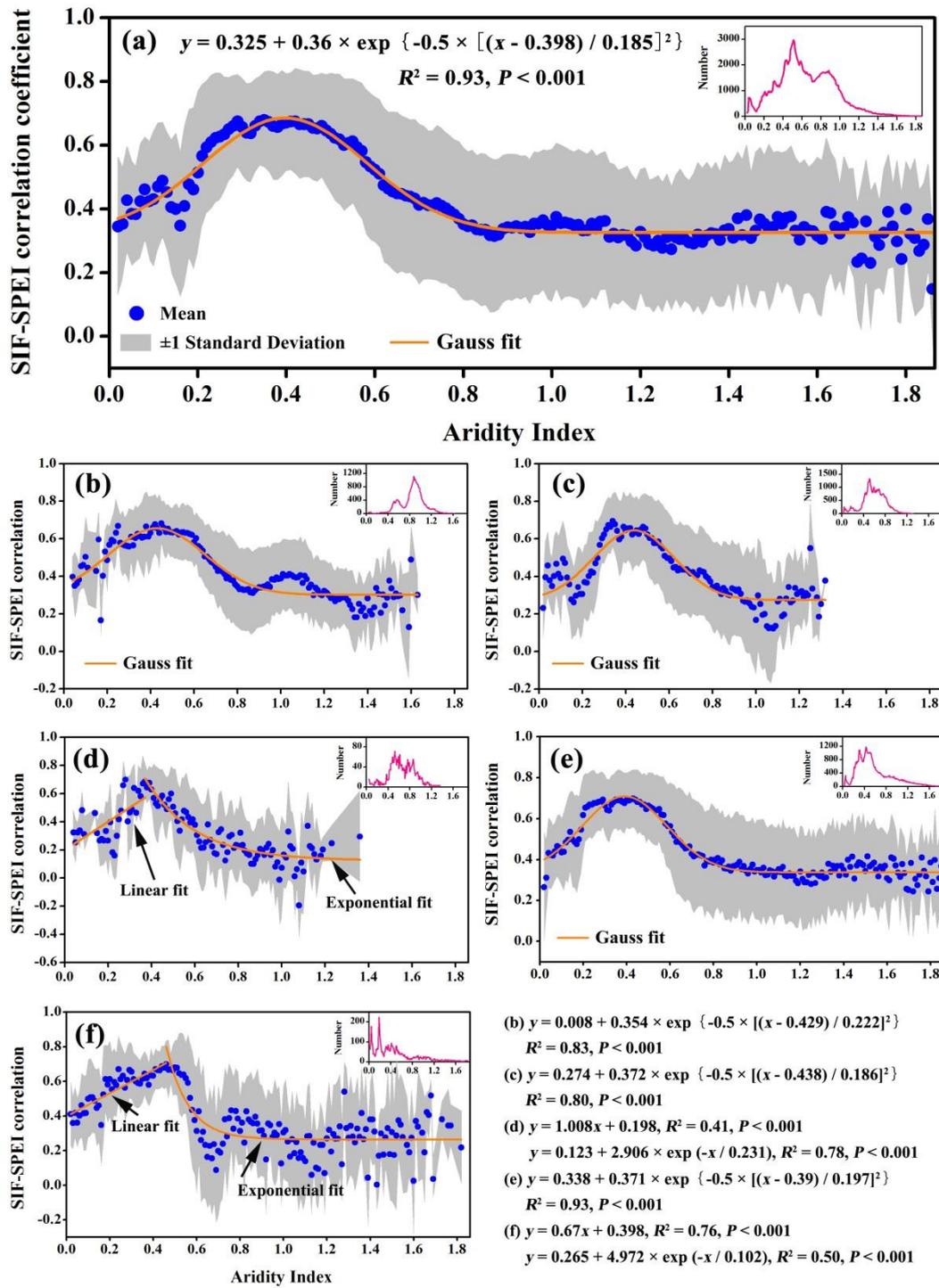


Fig.6 The variation of SIF-SPEI correlations with increasing aridity index (a. all biomes, b. forest, c. cropland, d. wetland, e. grassland, f. desert). The inset graph shows the number of observations in every aridity index bin. The fit function is shown on the lower right.

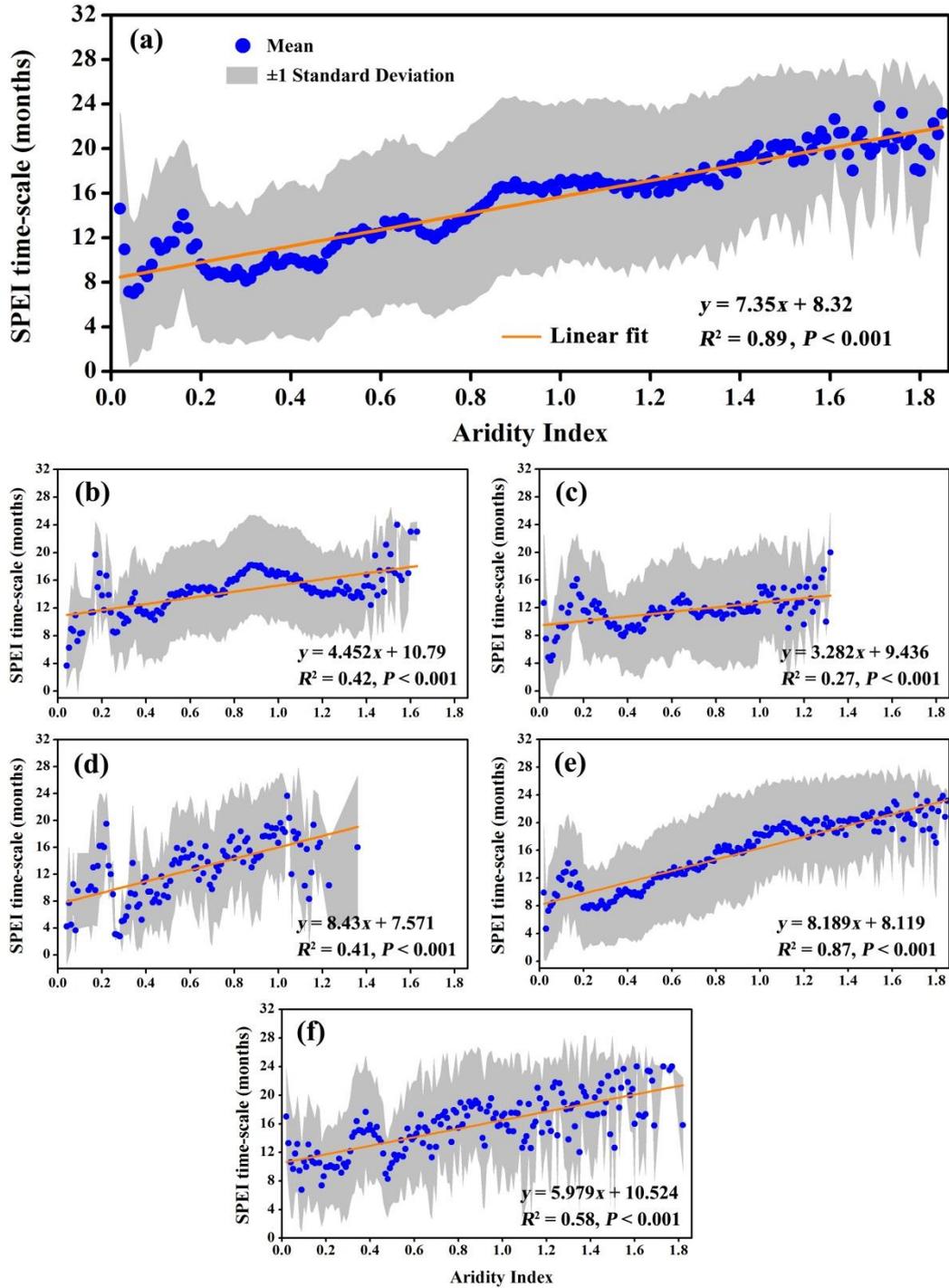


Fig.7 The variation of SPEI time-scales with increasing aridity index (a. all biomes, b. forest, c. cropland, d. wetland, e. grassland, f. desert). The number of observations in every aridity index bin is shown in Figure 6.