

Figure. S1 Comparison of filtering results of (a) different filtering methods, (b) a case and (c) the whole difference (*diff.*) by using different climate values in the filtering process

$$diff. = \frac{1}{N_{forecasts}} \sum_i^{N_{forecasts}} \sqrt{\frac{1}{N_{lat}N_{lon}} \sum_j^{N_{lat}} \sum_k^{N_{lon}} L(j)(f_{i,j,k} - t_{i,j,k})^2}$$

where f and t are the filtered results using 90-day low-pass-filtered climate values calculated from both ERA5 and CFS data, respectively. $L(j)$ is the weight factor as described in the manuscript.

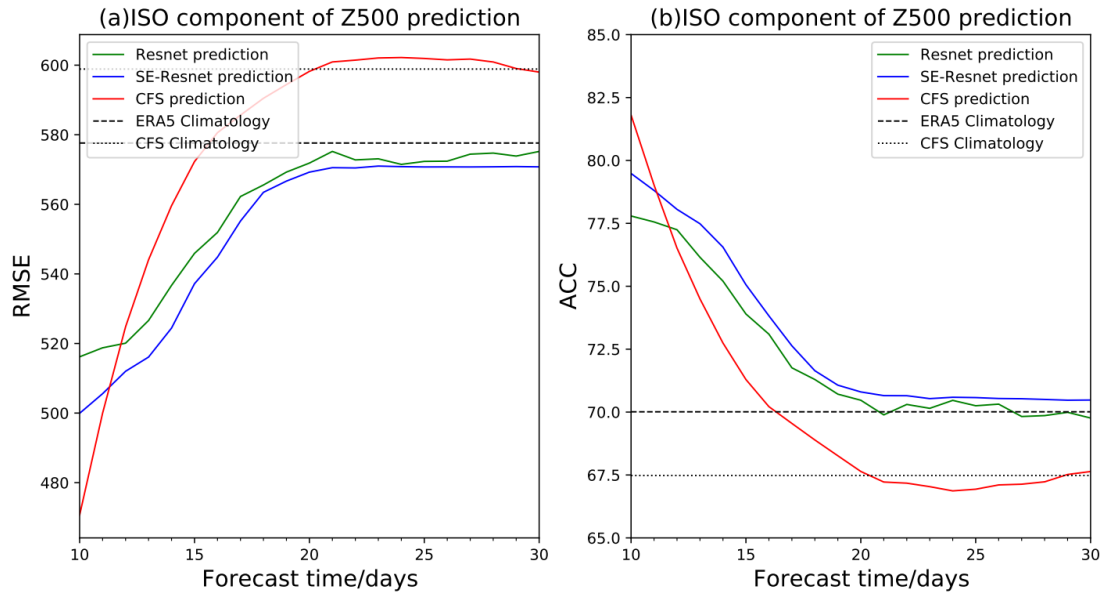


Figure S2. Mean (a) RMSE[m² s⁻²] and (b) ACC[%] of Z500 ISO components of model prediction varies with the forecast lead times evaluated against filtered ERA5 data.