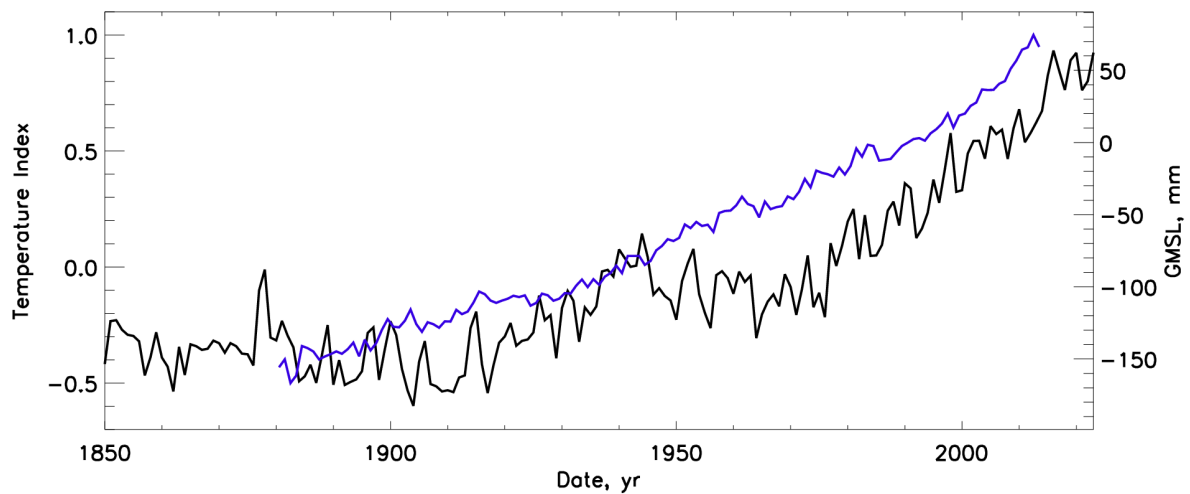# Solar magnetic field effects on terrestrial temperature and sea level

Figure 1. The close variations of the sea level (blue curve) to the terrestrial temperature variations measured by HadCRUT (black curve). Courtesy of Zharkova and Vasilieva, 2023, Natural Sciences, https://www.oalib.com/paper/6812235

Wavelet analysis of the GLB terrestrial temperature

Wavelet analysis of the GLB terrestrial dataset which clearly indicates the periods of 21.4 years (double sunspot solar cycle, or 21.4 year cycle solar eigen vectors) and 36 years.
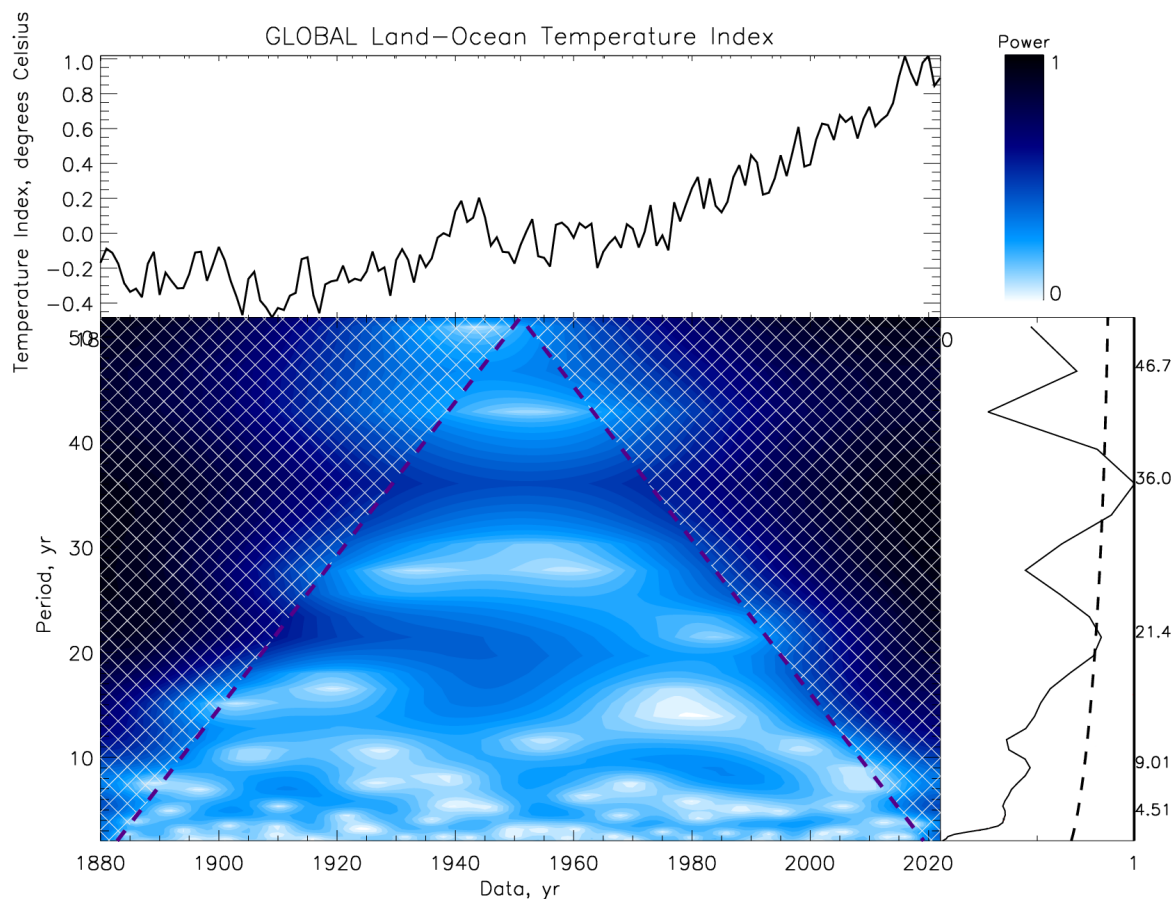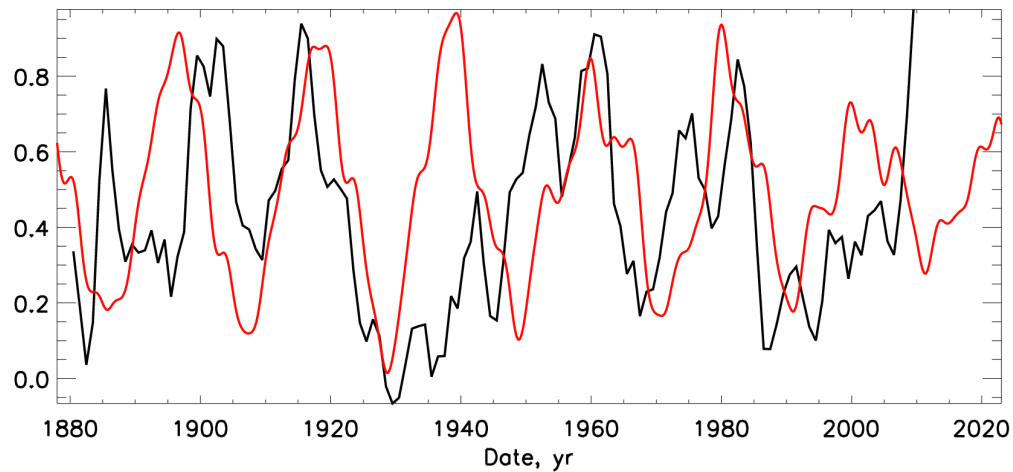
Figure 2. The GLB terrestrial temperature variations (upper plot), the wavelet spectrum of temperature (bottom plot) with the power marked by colour bar (the top right plot). The global wavelet spectrum of temperature is shown by the black solid line), 95% confidence interval by the black dashed line. Courtesy of Zharkova and Vasilieva, 2023, Natural Sciences, https://www.oalib.com/paper/6812235.

Solar magnetic waves from the two biggest eigen vectors and their summary curve derived with Principal Component Analysis from the solar background magnetic field of the daily magnetograms taken by the Wilcox Solar Observatory, Stanford University, US
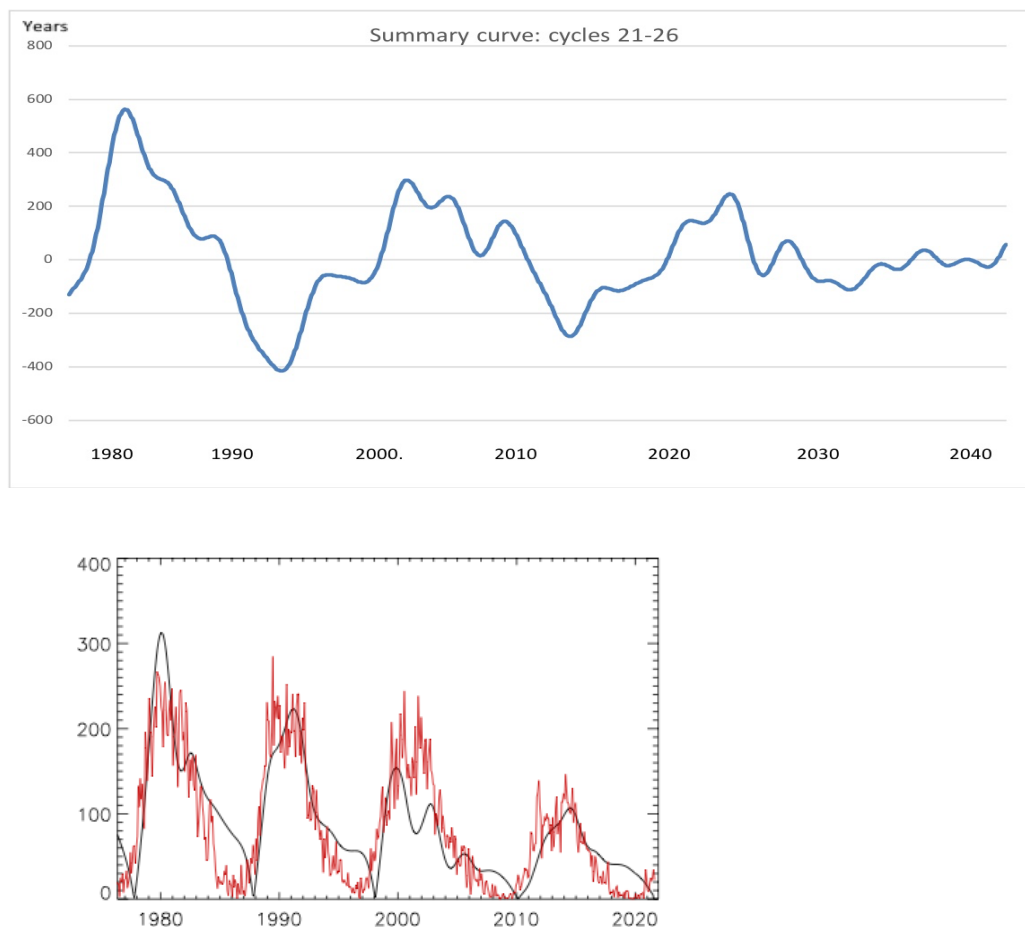

Figure 3 Top plot: The summary curve (in arbitrary units) of two principal components, PCs, for cycles 21 - 26 derived from the magnetic field data for cycles 21 - 23 and extrapolated for cycles 24, 25 and 26 (courtesy of Zharkova et al, 2015 https://www.nature.com/articles/srep15689.

Bottom plot: Modulus summary curve, in arbitrary units, derived from the summary curve above overplotted on the averaged sunspot numbers in cycles 21 - 24 (Courtesy of Zharkova and Vasilieva, 2023, Natural Sciences, https://www.oalib.com/paper/6812235) used as the current solar activity index (courtesy of Zharkova et al, 2022 https://solargsm.com/wp-content/uploads/2022/04/zharkova_shepherd_mnras22.pdf.

Figure 4. The variations of the level of the world ocean level (black line) versus the summary curve of SBMF (red curve). Courtesy of Zharkova and Vasilieva, 2023, Natural Sciences, https://www.oalib.com/paper/6812235.
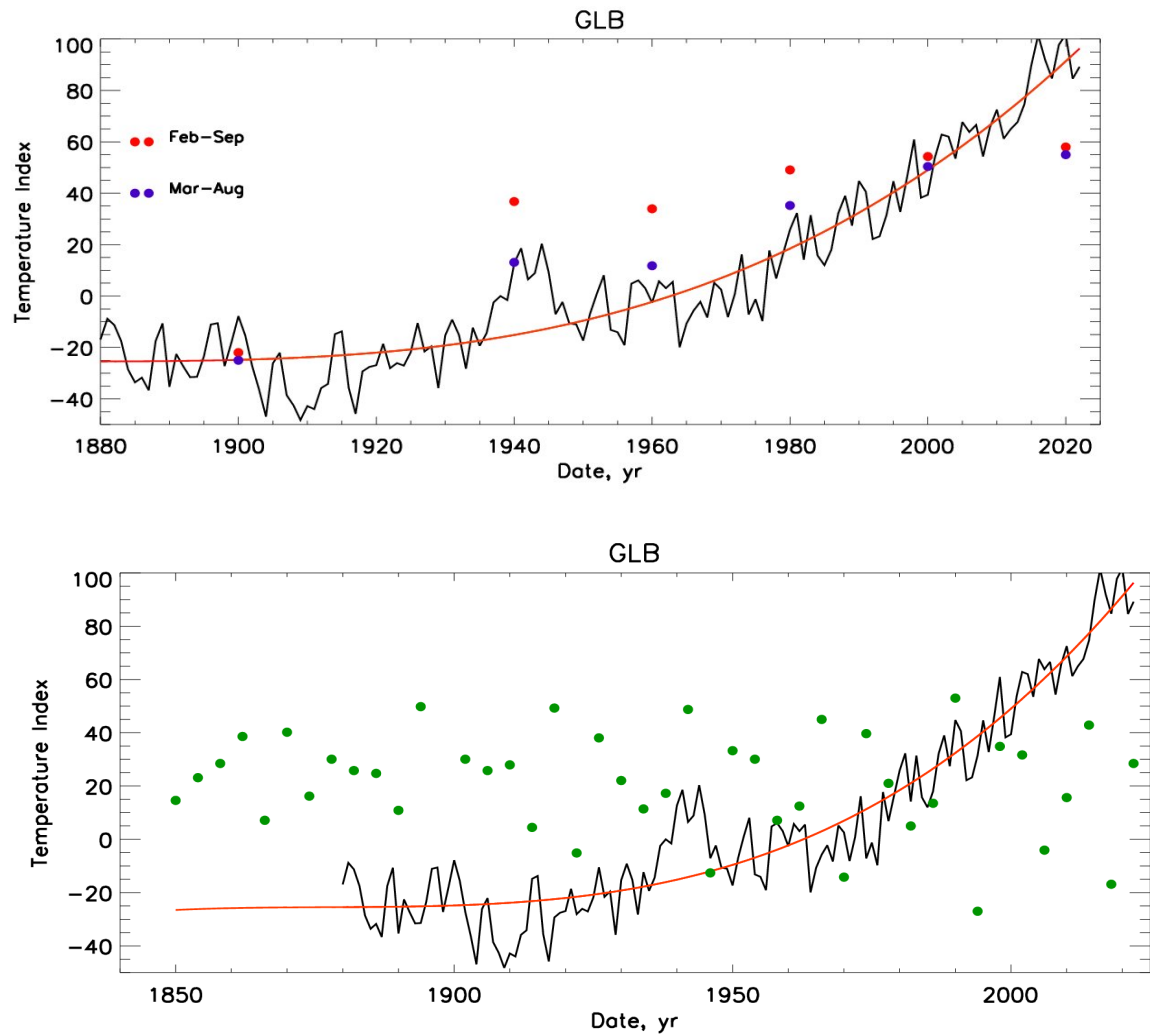
Figure 5. <u>Top plot:</u> The terrestrial temperature variations (black line) and averaged temperature (red line) versus the total solar irradiance (TSI) of the Sun affected by SIM in the

spring- summer months as per the legend on the plot. <u>Bottom plot:</u> The temperature plot as above. The dots show the annual total solar irradiance affected by SIM averaged for every 4 years including the leap years. The solar irradiance is calculated by adding the daily irradiance for all 12 months in the Northern hemisphere when the Sun is closest to the Earth's orbit [51]. Courtesy of Zharkova and Vasilieva, 2023, Natural Sciences, https://www.oalib.com/paper/6812235.