CO_2 Naturally Follows Solar-driven Climate Extremes

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Modern solar and climate data enables finer analysis of causal relationships than was possible when Svante Arrhenius established the scientific foundation of the greenhouse gas (GHG) theory of climate change that now includes human emissions. The IPCC AR5 WG1 depicts CO_2 as largely man-made and more powerful than irradiance changes, a view challenged here by evidence for >95% significance solar activity driven and deterministic atmospheric CO_2 levels and climate change. A Nino Intrayear Ratio (NIR) timeseries is introduced as annual ratios since 1870, calculated from each year's area-weighted Nino1-4 monthly averages first to second half. NIR 30-year average (30ya) lags the Solar Influences Data Center (SIDC) v2 sunspot number (SN) 30ya by 13 years and positive above SIDC 87 v2 SN, peaking in the 1990s. The detrended cumulative departure from average of annual Mauna Loa (ML) atmospheric CO_2 change was maximized during strong solar cycles 21-23, following a long-term increase in NIR, lagging the 30ya NIR by 1 year, both now declining from lower solar activity, positive above 106.7 SN. CO_2 acceleration correlates with NIR acceleration at zero lag. Nino34 regions define the Multi-Variate ENSO Index (MEI) with zero lag. Since 1980, 30ya HadSST3 global temperature was linear with and lagging 30y integrated MEI (iMEI). High sunspot activity and irradiance in the first half of each year enhances cyclic tropical ocean temperature and CO_2 outgassing from coral reef bleaching and $CaCO_3$ breakdown. Henry's Law (1803) solubility curve for CO_2 is replicated using Nino and ML data, CO_2 outgasses above 25.6°C, lagging HadSST3 by 10 months, leading to the conclusion that most atmospheric CO_2 is naturally produced, as is climate change. Future long duration low sunspot activity insures less CO_2 and a cooler, drier climate with possible dust bowl(s) while long high activity will again produce a wet warm green climate.