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Evidence & Causes 2020

Centre.

dataset, UK Met Ofﬁce, Hadley

time period from the HadCRUT4

mid-2018; temperature data for same

on the new VIRGO scale from 1978 to

Observatorium Davos, Switzerland,

Physikalisch-Meteorologisches

cycle. Source: TSI data from

associated with the Sun’s 11-year

small periodic amplitude variations

that period. The data show only

responsible for warming during

and therefore this cannot be

forcing during the past 40 years,

show no net increase in solar

Sun’s energy incident on Earth

Measurements of the

Figure .

induced increases in CO

concentrations have been the dominant inﬂuence on the long-term global

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surface temperature increase. Further evidence that current warming is not a result of solar changes can

be found in the temperature trends at different altitudes in the atmosphere (see Question 5).

pronounced long-term changes in the Sun’s output over the past century, during which time human-

a small effect on surface climate over the 11-year cycle. However, the available evidence does not indicate

50km above earth’s surface, depending on latitude and season). These stratospheric changes may have

and winds in the stratosphere (the layer in the atmosphere above the troposphere, typically from 12 to

which the Sun’s energy output varies by roughly 0.1%, can inﬂuence ozone concentrations, temperatures,

atmosphere are inﬂuenced by variations in the Sun. There is evidence that the 11-year solar cycle, during

abundance of certain forms (isotopes) of carbon or beryllium atoms, whose production rates in Earth’s

because the changes are inferred from indirect sources — including the number of sunspots and the

For periods before the onset of satellite measurements, knowledge about solar changes is less certain

[Figure ].

put, while at the same time global surface temperatures have increased

Direct satellite measurements since the late 1970s show no net increase in the Sun’s out-

variations have played very little role in the climate changes observed in recent decades.

The Sun provides the primary source of energy driving Earth’s climate system, but its

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climate change in recent decades?

What role has the Sun played in

Q& A n

