SCOSTEP
Scientific Committee on Solar-Terrestrial Physics

Distinguished Young Scientist Award – 2018 – Citation

Dr. Kok Leng Yeo from the Max Planck Institute for Solar System Research, Göttingen, Germany, is the recipient of SCOSTEP's 2018 Distinguished Young Scientist Award for her paramount contributions to understanding the causes of solar irradiance variations and to advances in irradiance models of relevance for climate.

Dr. Yeo is clearly poised to become a future leader in the important field of solar irradiance modeling and Sun-climate connections. She has already made substantial contributions to improving the leading-edge SATIRE model at MPS, including the assimilation of observed solar magnetograms and, even more significantly, synthesizing magnetograms from 3-D MHD simulations of solar surface convection. She received her PhD only four years ago and she already has 7 first-author papers, 5 papers with more than 10 citations, 7 invited talks, and 2 review papers. Her work has appeared in Physical Review Letters and Nature Astronomy as well as ApJ and A&A. Her reconstruction of solar irradiance from 1974-2013 (Yeo et al 2014) has already garnered 63 citations and her new work on SATIRE-3D may prove to be even more innovative and influential.

The work of Kok Leng focuses on understanding and modelling solar irradiance variations on time scales of days to decades, a topic of great interest and importance for models of global change of Earth's climate.

Kok Leng has reconstructed the total (TSI) and spectral (SSI) solar irradiance since 1974. Kok Leng has proposed and developed two independent empirical test models, which have helped to identify the source of the disagreement between the empirical and semi-empirical models. One of them is the EMPIRE model (Yeo et al. 2017a JGR 122), the first-ever empirical model that takes the errors-in-variables (i.e. errors in the solar activity proxies) into account. These results have convincingly proved that the larger solar cycle variability in the UV range, critical for Earth's atmospheric models, returned by the semi-empirical models is more accurate, which has significant implications for Earth's atmospheric and climate-chemistry models.

In the last years, Kok Leng has been working on the development of the first irradiance model of a new generation, SATIRE-3D. She has created the first ever model entirely independent of irradiance measurements (Yeo et al. 2017b, Physical Review Letters 119).

A remarkable aspect of Kok Leng's work is that she did it rather independently and that many of the ideas were her own. She is very independent, very inventive, deep thinking and original young researcher. For her PhD thesis, she received the very prestigious Fred L. Scarf Award "for outstanding PhD thesis" of the American Geophysical Union, an indication of Kok Leng's great standing in the field and is a tribute to the quality of her work and to her intellect.

Used in conjunction with climate simulations, her new reconstruction of solar total and spectral irradiance will definitely lead to a great leap in our understanding of solar influence on global climate change.