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• **Editorial Notes** •

Preface to the Special Topic on Ocean, Sea Ice and Northern Hemisphere Climate: In Remembrance of Professor Yongqi GAO's Key Contributions※

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This special issue commemorates the life work of Prof. Yongqi GAO who passed away in July 2021, his time cut short by illness. He had many great achievements, but still much more to contribute. The seven articles in this special issue are from research areas where he contributed, and they illustrate how his close colleagues are continuing his work.

Prof. GAO's career spanned the Eurasian continent. It started in 1988 with a bachelor's degree in atmospheric physics from the prestigious Peking University. He went on to work for more than ten years as an atmospheric scientist at the world-famous Institute of Atmospheric Physics, Chinese Academy of Sciences. With a growing interest in the ocean and climate modelling, in the late 1990's he began studying a PhD at the University of Bergen. In 2003 he was awarded his PhD entitled "Evaluation of the ocean ventilation processes in an isopycnic coordinate Ocean General Circulation Model". He went on to become a research director at the Nansen Environmental and Remote Sensing Center, Norway, while at the same time being the co-director of the Nansen-Zhu International Research Centre, China and an adjunct professor at the University of Bergen, Norway.

Prof. GAO participated in the expeditions to Mount. Qomolangma, Svalbard, and the Taklimakan Desert. He is most well-known for his ground-breaking contributions to climate dynamics with focus on the role of the ocean and cryosphere. His career coincided with global warming becoming a major international concern, and with rapid Arctic warming in the fore-front. Eurasia, however, experienced some of its most intense winters. Thus, much of his research was on climate change and to disentangle such confounding effects (warm Arctic−cool Eurasian winters), as well as on societal impacts of Arctic change. He published key review papers on Arctic warming, Arctic Oscillation, and Eurasian climate. Much of his work was based on cutting edge climate models. While in some of his early work, he validated the ocean component of the first Bergen Climate Model, which later evolved into the Norwegian Earth System Model. In his more recent work, he coordinated multi-modelling studies to identify the robust impacts of Atlantic and Pacific Oceans on the Arctic and Eurasia.

Most significantly, Prof. GAO greatly strengthened climate research across Eurasia through institution and career build-ing. He was central in developing a strong research collaboration between Norway and China. This was crucial to the success of the Nansen-Zhu International Research Centre and contributed greatly to the Bjerknes Centre for Climate Research. Numerous research visits between China and Norway drove cutting-edge science in the two countries, with almost 200 jointly co-authored peer reviewed articles. His efforts led to many successful joint projects, funded by research councils from Norway and China, the European Union, and NordForsk. They even led to a bilateral funding program for Chinese-Nor-wegian collaboration on the climate systems. The first call was in 2021 and it resulted in eight projects. Above all though, Prof. GAO was a dedicated supervisor and mentor, and he contributed to the successful careers of many students and researchers.

※ This paper is a contribution to the special topic on Ocean, Sea Ice and Northern Hemisphere Climate: In Remembrance of Professor Yongqi GAO's Key Contributions.

We have put together this special issue to recognizing Prof. GAO's great achievements. The special issue was made possible with the support of three other guest editors: Prof. Huijun WANG, Nanjing University of Information Science and Technology, China, as well as Prof. Jianqi SUN, Nansen-Zhu Centre, Institute of Atmospheric Physics, Chinese Academy of Sciences, China and Prof. Tore FUREVIK, Nansen Environmental and Remote Sensing Center, Norway. These three were also very close to Prof. GAO, as well as leaders of the institutes where he worked in China and Norway.

The articles in this special issue focus on Eurasia and the Arctic, and cover climate change, decadal variability, teleconnections, extreme events, and address societal implications of climate change. Zhao et al. (2024) refine future projections of Arctic sea ice through a novel model weighting approach, while Semenov et al. (2024) and colleagues present a new reconstruction of past Arctic sea ice that shows that there was very low sea ice cover in the 1940's. The impacts of Arctic sea ice reduction and internal atmospheric variability on Eurasia are quantified by He et al. (2024) using the Norwegian Earth System Model. Lei and Li (2024) investigate the impacts of Arctic, Pacific and Atlantic on the recent decadal change in the atmospheric circulation over Ural Mountains, while Han et al. (2024) demonstrate the influence of Tibetan Plateau heating and soil moisture on summer precipitation in Northeast China. Zheng et al. (2024) provide projections of extreme rainfall events in the Three Gorges Reservoir using a triple nested downscaling approach. Finally, Ogilvie et al. (2024) discuss the need for interdisciplinarity in Arctic research, and they do this by summarizing the ARCPATH project—a highly interdisciplinary Nordic Centre of Excellence led by Prof. Yongqi GAO.

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