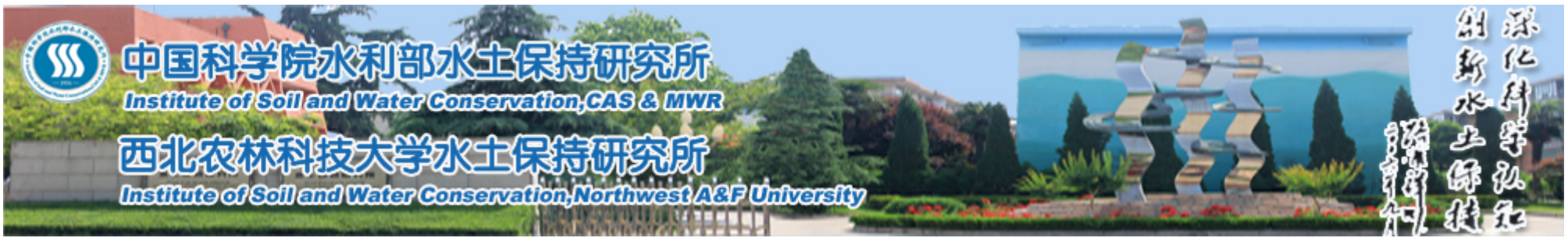


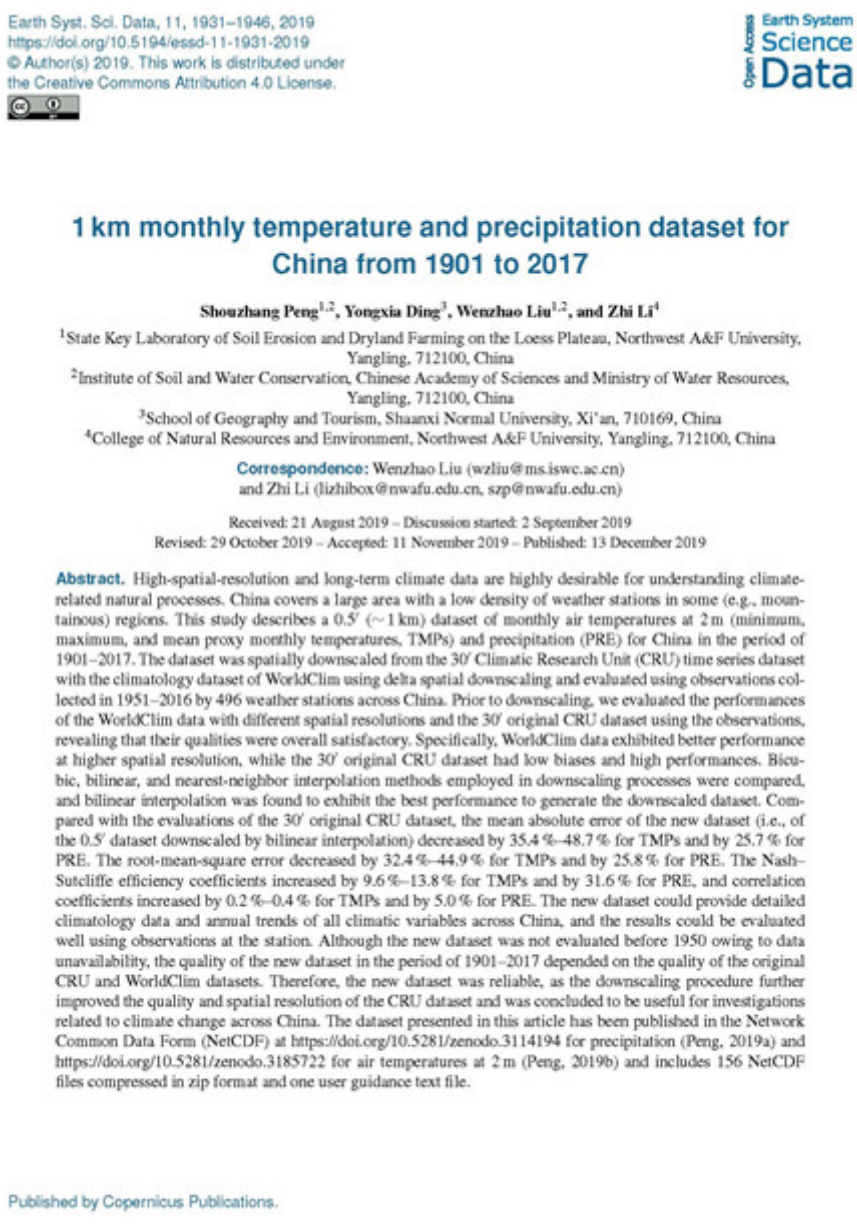
水保所科研人员在气候变化研究方面取得重要进展

2019-12-20| 信息来源：安塞站 | 浏览量：1957 | 【大 中 小】【打印】【关闭】

长时间序列高空间分辨率的气候数据是气候变化相关研究的基础。中国国土面积大，在青藏高原等高海拔山区的气象数据监测不足，严重限制了气候变化相关研究工作的开展。

为解决这一问题，安塞站副研究员彭守璋利用空间降尺度方案对长时间序列低空间分辨率55km的气候数据集（CRU v4.02）进行降尺度处理，生成了1901-2017年中国1km月气候数据集（包括月最低温、最高温、均温及降水量），并结合中国496个气象站点数据对降尺度结果进行评价，证明方法可靠，生成的数据精度较高。该数据集是我国目前时间序列最长、空间分辨率最高、覆盖面积最广的月气候数据集，可为中国地区气候变化相关研究提供支撑。

目前，该数据集已被国内外同行下载24845次。全球科研人员可通过黄土高原科学数据中心和欧洲科塔数据中心进行下载。相关成果于2019年12月13日发表在地学顶级期刊《地球系统科学数据》（Earth System Science Data，IF2019=10.951）上。该研究得到了第二次青藏高原综合考察研究项目（2019QZKK0603)的资助。



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https://doi.org/10.5194/essd-11-1931-2019

Earth System Science Data

1 km monthly temperature and precipitation dataset for China from 1901 to 2017

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Abstract. High-spatial-resolution and long-term climate data are highly desirable for understanding climate-related natural processes. China covers a large area with a low density of weather stations in some (e.g., mountainous) regions. This study describes a 0.5′ (~1 km) dataset of monthly air temperatures at 2 m (minimum, maximum, and mean proxy monthly temperatures, TMPs) and precipitation (PRE) for China in the period of 1901–2017. The dataset was spatially downscaled from the 30′ Climatic Research Unit (CRU) time series dataset with the climatology dataset of WorldClim using delta spatial downscaling and evaluated using observations collected in 1951–2016 by 496 weather stations across China. Prior to downscaling, we evaluated the performances of the WorldClim data with different spatial resolutions and the 30′ original CRU dataset using the observations, revealing that their qualities were overall satisfactory. Specifically, WorldClim data exhibited better performance at higher spatial resolution, while the 30′ original CRU dataset had low biases and high performances. Bicubic, bilinear, and nearest-neighbor interpolation methods employed in downscaling processes were compared, and bilinear interpolation was found to exhibit the best performance to generate the downscaled dataset. Compared with the evaluations of the 30′ original CRU dataset, the mean absolute error of the new dataset (i.e., of the 0.5′ dataset downscaled by bilinear interpolation) decreased by 35.4 %–48.7 % for TMPs and by 25.7 % for PRE. The root-mean-square error decreased by 32.4 %–44.9 % for TMPs and by 25.8 % for PRE. The Nash–Sutcliffe efficiency coefficients increased by 9.6 %–13.8 % for TMPs and by 31.6 % for PRE, and correlation coefficients increased by 0.2 %–0.4 % for TMPs and by 5.0 % for PRE. The new dataset could provide detailed climatology data and annual trends of all climatic variables across China, and the results could be evaluated well using observations at the station. Although the new dataset was not evaluated before 1950 owing to data unavailability, the quality of the new dataset in the period of 1901–2017 depended on the quality of the original CRU and WorldClim datasets. Therefore, the new dataset was reliable, as the downscaling procedure further improved the quality and spatial resolution of the CRU dataset and was concluded to be useful for investigations related to climate change across China. The dataset presented in this article has been published in the Network Common Data Form (NetCDF) at https://doi.org/10.5281/zenodo.3114194 for precipitation (Peng, 2019a) and https://doi.org/10.5281/zenodo.3185722 for air temperatures at 2 m (Peng, 2019b) and includes 156 NetCDF files compressed in zip format and one user guidance text file.

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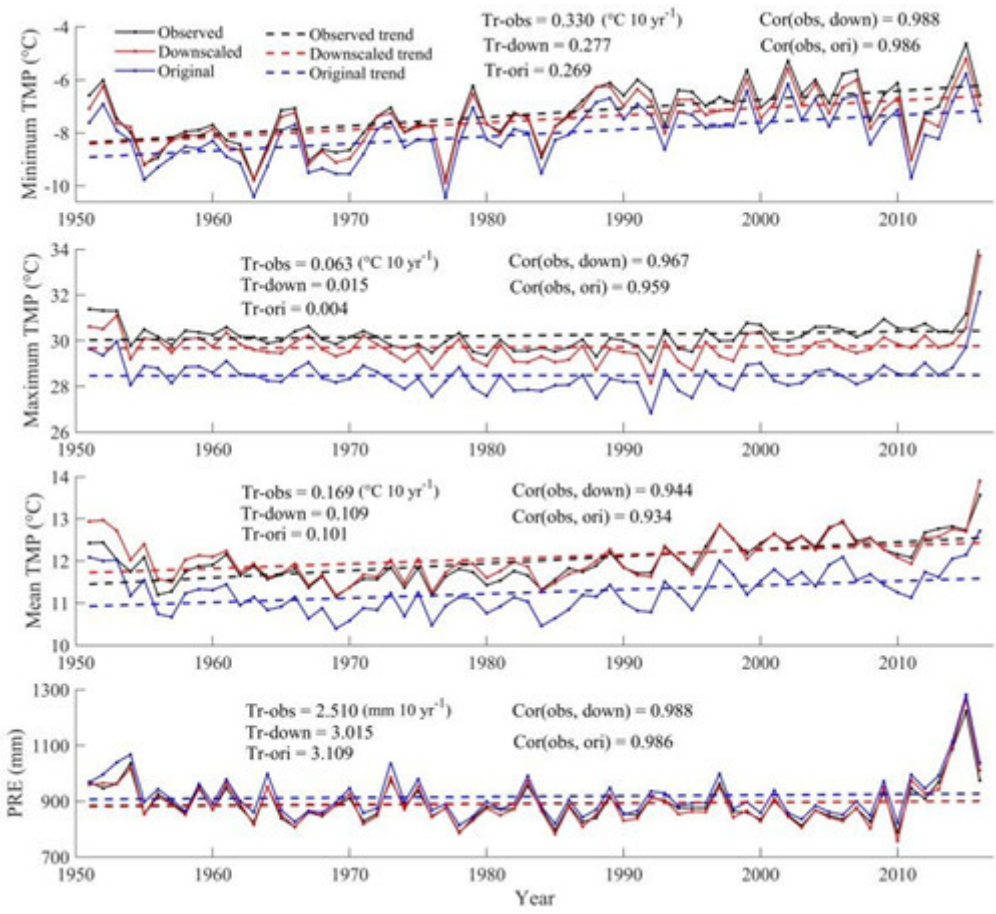

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http://loess.geodata.cn （降水与温度）

欧洲科塔数据中心：

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https://doi.org/10.5281/zenodo.3185722 （温度）

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