城市气象科技信息监测简报
（资讯类）

2022 年 11 月 （总第 17 期）

北京气象学会
北京城市气象研究院

2022 年 12 月 8 日

前 言

2021年7月，依托北京城市气象研究院行业信息监测与分析系统，北京气象学会与支撑单位北京城市气象研究院联合制作了《城市气象科技信息监测简报》，定期为会员提供科技信息服务。简报每月一期，每期分为文献和咨询两类。

目前，学会主要依据城市气象领域的关键词搜索信息，并形成每月简报。欢迎各位会员向我们提供相关科技领域信息及其搜索关键词，不断扩充简报的专业领域范围，丰富简报的内容，以更好地满足广大会员朋友们对快速更新科技信息的需求。

同时，热诚欢迎广大会员对简报的科技信息内容、展现形式、阅读体验和收获感悟等提出建议和点评。编辑团队将遴选出优秀建议和点评内容刊载在简报上。

2020年12月，学会换届成立了第21届理事会，现拥有52 家理事单位和 947 名会员。我们希望借助此简报，为广大会员朋友们提供高质高效的科技信息服务，同时在大家的支持和帮助下，我们共同将简报建设成为会员交流的友好平台。

编辑团队:

苏　晨 北京城市气象研究院办公室副主任

楚艳丽　北京气象学会副秘书长、北京城市气象研究院副研究员

苗世光　北京气象学会秘书长、北京城市气象研究院院长

郭佩芸 北京城市气象研究院专职副书记

胡永云 北京气象学会理事长、北京大学教授

刘　燕 北京气象学会副秘书长

目　录

❖报告概述 2

✧监测周期 2

✧监测主题 2

❖行业动态 2

✧新闻资讯 2

1. Triple-Dip La Nina persists, prolonging drought and flooding 2
2. 大气科学: 中国地区植被变化及其与气候变化和人类活动的关系 3
3. NC: 最新研究揭示了近 20 年来东亚沙尘暴活动减弱的原因 3
4. COP27: We need a complete energy transformation 4
5. TAC: 北印度洋和热带北大西洋海温对 2020 年夏季长江流域特大洪涝的影响研究 5
6. Greenhouse gas monitoring supports Earth observations 6
7. CD: 利用 CAS-ESM-c 超前 2 个月的成功预测来探索 2020/21 年冬季寒潮爆发的物理机制 6
8. Finance and climate communities want to close weather and climate data gaps 7
9. Ten Essential Climate Science Insights for 2022 presented at COP27 8
10. IRENA and World Meteorological Organization Join to Promote Clean Energy Transition 9
11. Boosting the provision of essential weather and climate data 9
12. Early Warnings for All Action Plan unveiled at COP27 10
13. Idealized 2D Cloud 11
14. NC: 基于降水变率观测约束能够提高极端降水预估可靠性 12
15. Eight warmest years on record witness upsurge in climate change impacts 12
16. AOSL: 2022 夏季罕见热浪破历史记录——日益增加的极端高温威胁 13
17. Temperatures in Europe increase more than twice global average 14
18. 郭维栋教授研究团队揭示大规模毁林/造林对日际温度变率的影响 14
19. SA: 气候变化背景下自然保护区缓冲增温为生物提供庇护 15
20. JC: 晚夏中国东南地区极端干旱的形成：中纬度和热带环流系统耦合的视角 16
21. LRH-WP: 未来气候和人口变化将共同导致中国区域热浪相关健康风险增加 16

❖报告概述

✧监测周期

2022 年 11 月 01 日 – 2022 年 11 月 30 日

✧监测主题

行业动态——新闻资讯

❖行业动态

✧新闻资讯

本监测周期内，资讯信息共更新 21 条：

1. Triple-Dip La Nina persists, prolonging drought and flooding

Geneva, 30 November 2022 - The unusually stubborn and protracted La Niña event is likely to last until the end of the northern hemisphere winter/southern hemisphere summer. The first “triple-dip” La Niña (three consecutive years) of the 21st century will continue to affect temperature and precipitation patterns and exacerbate drought and flooding in different parts of the world, according to the World Meteorological Organization (WMO).The WMO El Niño/La Niña Update indicates about a 75% chance that La Niña will persist during December-February 2022/2023 and 60% chance during January-March 2023.There is a 55% chance of ENSO-neutral conditions (neither El Niño or La Niña) emerging during February-April 2023, increasing to about 70% during March-May, according to the Update, which is based on input from experts and forecast models around the world.It is only the third time since 1950 that there has been a triple-dip La Niña.La Niña refers to the large-scale cooling of ocean surface temperatures in the central and eastern equatorial Pacific Ocean, coupled with changes in the tropical atmospheric circulation, namely winds, pressure and rainfall. It usually has the opposite impacts on weather and climate as El Niño, which is the warm phase of the so-called El Niño Southern Oscillation (ENSO).La Niña is a natural phenomenon. But it is taking place against a background of human-induced climate change, which is increasing global temperatures, making our weather more extreme and affecting seasonal rainfall patterns.Humanitarian crisis“The tropical Pacific has been in a La Niña state, with short interruptions, since September 2020 – but this has only had a limited and temporary cooling impact on global temperatures,” said WMO Secretary-General Prof.

来源：WMO

发布时间：2022-11-30

数据类型：资讯

https://public.wmo.int/en/media/press-release/triple-dip-la-ni%C3%B1a-persists-prolonging-drought-and-flooding

2. 大气科学: 中国地区植被变化及其与气候变化和人类活动的关系

摘要：上世纪 80 年代以来，全球植被指数显著增大，包括中国在内，植被有明显“变绿”的趋势。然而，目前基于遥感数据对植被覆盖变化的研究还存在诸多争议。中国地域辽阔，气候特征多样，植被类型丰富，人类活动影响剧烈，植被变化的原因更加复杂，迫切需要对中国不同气候区植被与人类活动和气候因子的关系及差异进行对比分析，为应对气候变化、生态环境保护和实现区域可持续发展提供科学依据。近日，中国科学院大气物理研究所马柱国研究员团队的李卓忆同学和韩云环博士分别发表了题为“中国不同干湿区植被变化及其与气候因子的关系研究”和“中国北方干旱半干旱区植被对气候变化和人类活动的响应”的论文。这两项研究分别以归一化植被指数(Normalized Difference Vegetation Index, NDVI)和叶面积指数(Leaf Area Index, LAI)为对象，分析了近几十年来中国地区植被变化的事实及成因。结果表明，1982-2015 年中国大部分区域 NDVI 呈显著的增加趋势。中国区域年降水量等值线(200、500 和 800 mm)与不同植被带分界线吻合，即气候过渡带对应着植被过渡带。区域平均 NDVI 在干旱区和半干旱区显著增加，在半湿润区和湿润区虽也呈现出增加趋势，但均不显著（图 1）。气温对四个干湿区 NDVI 时间变化的解释率相差不大，均在 30%左右；降水的解释率略低于温度，其中对干旱区和半干旱区的解释率较大，分别为 18%和 20%，说明降水主要影响着北方地区植被的生长。在中国北方干旱半干旱地区，自 80 年代以来 LAI 也呈显著增长趋势，其中生长季 LAI(ALAI)显著增加的地区占植被覆盖区总面积约 67%。

来源：大气物理所

发布时间：2022-11-28

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221128_6556448.html

3. NC: 最新研究揭示了近 20 年来东亚沙尘暴活动减弱的原因

摘要：沙尘暴是我国主要的灾害之一，对国民生产生活活动和身体健康都有重要影响。同时，沙尘气溶胶作为地球系统的重要组成部分，对辐射、冰云、风尘堆

积和海洋碳循环均有重要作用。另外，沙尘暴活动作为气候环境变化的指示器，也是认识地球系统演变的“一面镜子”。近几十年来，东亚沙尘暴活动整体上呈减弱的趋势。特别是经历了本世纪初沙尘暴活动较为活跃的时期后，近 20 年来沙尘暴活动持续减弱。过去沙尘暴活动变化的原因是什么，其未来将如何变化，这是广为关注的科学和社会问题。如果不厘清沙尘暴活动历史变化的原因，将很难对其未来的变化趋势做出准确预测。鉴于此，中国科学院大气物理研究所吴成来副研究员、林朝晖研究员联合德国科隆大学邵亚平教授、美国德州农工大学刘小红教授、国家气候中心李莹高级工程师等人利用团队开发的风蚀起沙模型（DuEM v1），开展了 2001-2017 年东亚地表起沙通量的模拟试验，并通过考虑地表风速、土壤湿度、植被覆盖等单个因子变化的多组敏感性试验间的对比，量化了地表风速、土壤湿度、植被覆盖等不同因子对 2001-2017 年东亚沙尘暴活动减弱趋势的分别贡献。结果表明，DuEM 起沙模型很好地模拟出了 2001-2017 年东亚沙尘暴频次的年际变化和减弱趋势（图 1）；相比于 2001 年，2010-2017 年东亚主要沙尘源区（35-49 oN，94-126.5oE）的起沙量从 3.08 亿吨/年减少到了 2.02 亿吨/年，减弱明显。从变化的原因来看，沙尘源区上地表风速减弱、植被覆盖增加、土壤变湿均起到了重要作用，分别贡献 46%、30%、24%（图 2）。

来源：大气物理所

发布时间：2022-11-22

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221122_6551794.html

4. COP27: We need a complete energy transformation

摘要：The need for a complete transformation of the global energy system away from fossil fuels to renewables is critical to avert increasingly dangerous climate change impacts. The technology exists but time is not on our side. Access to reliable weather, water and climate information and services will be increasingly important to strengthen the resilience of energy infrastructure and support the energy transition.These were the underlying message from the World Meteorological Organization at Energy Day at the UN climate change negotiations, COP27, on 15 November.'Greenhouse gas concentrations are at record levels," said WMO Deputy Secretary-General Dr Elena Manaenlova. “Unless there are immediate and deep emissions reductions across all sector, limiting global warming to 1.5°C will be beyond reach.”“Options are available now in every sector that can at least

halve emissions by 2030,' Dr Manaenkova said at an event at the UN Framework Convention on Climate Change pavilion with the Global Energy Interconnection Development and Cooperation Organization (GEIDCO).WMO's recent report on the State of Climate Services 2022 on Energy showed how Energy is at the very heart of our response to the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change.Given that the energy sector contributes around three quarters of global greenhouse gas emissions, rapid decarbonization to achieve Net zero by 2050 is vital.

来源：WMO

发布时间：2022-11-16

数据类型：资讯

https://public.wmo.int/en/media/news/cop27-we-need-complete-energy-transformation

5. TAC: 北印度洋和热带北大西洋海温对 2020 年夏季长江流域特大洪涝的影响研究

摘要：2020 年夏季我国长江流域遭遇重大洪涝灾害，总降雨量达 759.2mm，为 1961 年以来最多。以往研究中，夏季长江流域降水异常偏多往往与超强东太平洋型厄尔尼诺事件有关。然而，2020 年前冬热带太平洋只表现为弱的中太平洋型厄尔尼诺。中国科学院大气物理研究所季风系统研究中心周连童研究员团队从北印度洋（NIO）和热带北大西洋（NTA）海温出发，研究了两大洋海温异常对2020年夏季长江流域降水异常的影响和机理。该工作近期发表在 Theoretical and Applied Climatology 上。该研究发现，造成 2020 年夏季长江流域降水异常偏多的关键环流系统是西北太平洋异常反气旋（WNPAC），它的异常强大和长时间维持，为降水提供了有利环流和水汽条件。（NIO）和 NTA 地区存在较强暖海温，二者对 WNPAC 生成和维持有重要作用，且以 NIO 海温强迫占主导。NIO 暖海温激发东传大气开尔文波和异常沃克环流引起 WNPAC 增强，并且 NIO 暖海温和 WNPAC 之间存在正反馈过程。NTA 暖海温引起异常上升，通过纬向垂直环流在热带中东太平洋引起下沉，下沉区降水负异常通过非绝热冷却激发 Gill 响应造成 WNPAC 进一步增强（图 1）。该研究得到国家重点研发计划“全球变化与应对”重点专项（2016YFA0600603）和国家自然科学基金项目（42105063）的共同资助。

来源：大气物理所

发布时间：2022-11-16

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221116_6549203.html

6. Greenhouse gas monitoring supports Earth observations

摘要：A planned global greenhouse gas monitoring infrastructure would greatly enhance Earth observations and play a pivotal role in informing international efforts to cut greenhouse gas emissions, according to top WMO scientists at the UN climate conference, COP27.WMO has been explaining the potential value of a framework for sustained, internationally coordinated global greenhouse gas monitoring to negotiators. The aim is to get official recognition of the approach in the UN Framework Convention on Climate Change (UNFCCC) process, in conjunction with the already established Global Climate Observing System and State of the Global Climate reports.At the moment, information provided to the UNFCCC to support mitigation actionrelies solely on highly standardized reporting by countries. And even though greenhouse gas concentrations are observed in some places, these observations are often supported by research funding.Existing international exchange of observations of greenhouse gases and the use of them for routine model-based monitoring is significantly behind the practices used in weather prediction.This means that there is still considerable uncertainty about distribution and variability of greenhouse gas fluxes – including the amount of carbon exchanged between the oceans, the atmosphere and the land surface due to the combination of natural and anthropogenic processes. Poorly observed areas include Africa, South America and substantial part of Asia, as well as observations over the ocean and in high latitudes represent a particular challenge.“Rather than relying only on national reporting of emissions, it would be better to complement this with monitoring based on both ground-based measurements, satellites and modelling tools,” WMO Secretary-General Prof. Petteri Taalas told Earth Information Day at COP.

来源：WMO

发布时间：2022-11-14

数据类型：资讯

https://public.wmo.int/en/media/news/greenhouse-gas-monitoring-supports-earth-observations

7. CD: 利用 CAS-ESM-c 超前 2 个月的成功预测来探索 2020/21 年冬季寒潮爆发的物理机制

摘要：在 2020/21 年冬季的前半段（2020 年 12 月 1 日-2021 年 1 月 10 日），影响我国的冷空气活动持续偏强（一次全国型强冷空气，两次全国型寒潮），导致我国中东部大部地区气温显著异常偏低，部分站点最低气温甚至突破台站历史观测极值。但是国际上各机构（包括 NCC、NCEP、ECMWF 和 JMA）的季节预测模式提前一个月并未对 2020 年 12 月的极端低温给出较为准确的预测。而中科院地球系统模式气候模式版本 CAS-ESM-c 通过中国科学院大气物理研究所郑飞研究员课题组近几年持续发展和建立的耦合框架下预测初始化系统，显著地提升了其短期气候预测性能。CAS-ESM-c 在 2020 年 10 月参加年度气候预测会商时则提前 2 个月给出了我国中东部气温异常偏低的预测结果（图 1）。图 1. 国际各季节预测模式（b-e）提前 1 个月对中国 2020 年 12 月平均气温的预测情况，相比之下 CAS-ESM-c 提前 2 个月的预测结果更加接近实况。CAS-ESM-c 提前准确的预测为探寻促使寒潮爆发的关键因素和物理机制提供了可能。郑飞等人通过分析初始场中的北半球海温配置和集合预测成员中的优劣差异，指出对 2020/21 年冬季寒潮入侵的成功预测，源于对暖北极冷热带的海洋初始条件的精准刻画，以及合理体现前期秋季北极偏暖的气候效应（图 2）。暖北极冷热带的海洋初始条件为极端寒潮入侵提供了背景条件，半球尺度的经向梯度减弱有利于冷空气入侵的频繁发生。而最优预测样本中靠近欧亚大陆的巴伦支海等海域海温显著偏高，更促进了乌拉尔阻塞高压等天气过程的形成和维持。图 2. 显著有利于 CAS-ESM-c 提前 2 个月成功预测寒潮爆发的初始场中半球尺度海温配置（左）和初始场中最优和最差预测样本的北极海温差异（右）。

来源：大气物理所

发布时间：2022-11-14

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221114_6548093.html

8. Finance and climate communities want to close weather and climate data gaps

摘要：The finance and meteorological communities came together at COP27 to discuss how to close weather and climate data gaps and how to use climate data for more effective economic policies. The session on 10 November was co-hosted by the Coalition of Finance Ministers for Climate Action and the World Meteorological Organization. It demonstrated the groundswell of support for the Systematic Observations Financing Facility (SOFF), which aims to mobilize additional funding to ensure that the most vulnerable countries can acquire and exchange the essential weather and climate data that

underpins all adaptation efforts.“Climate data is economic data,” said Mari Pangestu, Managing Director of Development Policy and Partnerships, World Bank Group.This was echoed by Bo Li, Deputy Managing Director, International Monetary Fund.“Science based solutions and data are more important than ever. The quality of climate analysis depends on the data. Unfortunately, while we have come a long way to expand and improve weather observations there are currently gaps in weather data,” he said.Weather and climate data is essential for both finance ministries and the climate-science community to model the future, assess physical risks, and formulate climate strategies and policies.“We need the climate data and to match it with our economic and financial data.

来源：WMO

发布时间：2022-11-11

数据类型：资讯

https://public.wmo.int/en/media/news/finance-and-climate-communities-want-close-weather-and-climate-data-gaps

9. Ten Essential Climate Science Insights for 2022 presented at COP27

摘要：Leading global scientific experts presented the annual 10 New Insights in Climate Science to the UN climate change negotiations, COP27, today. The annual update presents key insights from the latest climate change-related research this year and responds to clear calls for policy guidance. It emphasizes and unpacks the complex interactions between climate change and other drivers of risk, such as conflicts, pandemics, food crises and underlying development challenges in the report.The 10 Insights report is convened by the international networks Future Earth, The Earth League and the World Climate Research Programme, which is co-sponsored by WMO.“Science is at the heart of everything we do. Science is our common language. It’s a foundational element that informs the COP negotiating process. Science provides the evidence and data on the impacts of climate change but it gives us the tools and knowledge on how we need to address it,” Simon Stiell, Executive Secretary of the UN Convention on Climate Change (UNFCCC) told a press conference.“The insights of this report are alarming, confirming what we already know and giving us insights into other areas where further action is needed,” he said.The scientific synthesis report identifies that the potential to adapt to climate change is not limitless.

来源：WMO

发布时间：2022-11-10

数据类型：资讯

https://public.wmo.int/en/media/news/ten-essential-climate-science-insights-2022-presented-cop27

10. IRENA and World Meteorological Organization Join to Promote Clean Energy Transition

摘要：Sham el-Sheikh / Egypt, 10 November 2022 – The International Renewable Energy Agency (IRENA) and the World Meteorological Organization (WMO) will work together to support the transition to renewable energy through tailored weather, water and climate services.A Memorandum of Understanding signed today at the UN Climate Conference COP27 in Sham el-Sheikh by IRENA's Director-General Francesco La Camera and WMO's Secretary-General Prof Petteri Taalas, formalises the cooperation.In pursuit of the common objective of a just transition aligned with the Sustainable Development Goals and Paris Agreement, both sides agreed to promote energy access and climate sustainability by harnessing climate and meteorological data, products, and services.IRENA Director-General Francesco La Camera said: "The resilience of energy systems is bound to become even more important with climate-related shocks. Now is the time to accelerate the transition to a renewable energy future. Anything short of radical and immediate action will ultimately eliminate the chance of staying on the 1.5° path. This strategic collaboration will contribute to the climate discourse and beyond."WMO Secretary-General Prof Petteri Taalas added: "It is clear that without a rapid transition to renewable sources of energy, we will not be able to reduce greenhouse gases emissions and keep global temperature increase within the Paris Agreement targets. Weather, water and climate services are fundamental to cost-effective, sustainable, affordable and accessible renewable energy.

来源：WMO

发布时间：2022-11-10

数据类型：资讯

https://public.wmo.int/en/media/news/irena-and-world-meteorological-organization-join-promote-clean-energy-transition

11. Boosting the provision of essential weather and climate data

摘要：Sharm el-Sheikh, Egypt, 9 November 2022 – The partners of the Systematic Observations Financing Facility (SOFF) met at a high-level event at the United Nations Climate Change Conference COP27 to mobilize additional funding to ensure that the most vulnerable countries have the means to acquire and exchange the essential weather and climate data that underpins all adaptation efforts.SOFF focuses on supporting Small Island

Developing States (SIDS) and Least Developed Countries (LDCs) to close the large gaps in basic weather and climate data which are essential to forecasts, build climate resilience and to ensure effective implementation of the new Action Plan to ensure that everyone on Earth is protected by early warnings in the next five years.“We must invest equally in adaptation and resilience. That includes the information that allows us to anticipate storms, heatwaves, floods and droughts”, United Nations Secretary-General Antonio Guterres told the World Leaders Summit at COP27 in reference to the Early Warnings for All Action Plan. “Early warning systems save lives and protect livelihoods. We must work to scale up SOFF in support of the Secretary-General’s Early Warning Systems for All Initiative as an urgent priority.' stated Selwin Hart, the United Nations Special Adviser to the Secretary-General on Climate Action and Just Transition. SOFF provides long-term technical and grant-based financial assistance to enable countries to acquire and internationally exchange basic weather and climate data. It was established at COP26 in 2021 by the World Meteorological Organization (WMO), the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP) as a United Nations Multi Partner Trust Fund (UNMPTF). One year later, SOFF is fully operational.

来源：WMO

发布时间：2022-11-09

数据类型：资讯

https://public.wmo.int/en/media/press-release/boosting-provision-of-essential-weather-and-climate-data

12. Early Warnings for All Action Plan unveiled at COP27

摘要：Sharm el-Sheikh, Egypt, 7 November 2022 (WMO) - It will cost the equivalent of just 50 cents per person per year for the next five years to reach everyone on Earth with early warnings against increasingly extreme and dangerous weather, according to a plan unveiled today by United Nations Secretary-General António Guterres.The Executive Action Plan for the Early Warnings for All initiative calls for initial new targeted investments between 2023 and 2027 of US$ 3.1 billion – a sum which would be dwarfed by the benefits. This is a small fraction (about 6 percent) of the requested US$ 50 billion in adaptation financing. It would cover disaster risk knowledge, observations and forecasting, preparedness and response, and communication of early warnings.Mr Guterres announced the plan at a meeting of government and UN organization leaders, financing

agencies, Big Tech companies and the private sector during the World Leaders Summit at the UN climate change negotiations, COP27. The plan was drawn up by the World Meteorological Organization and partners, and it was supported by a joint statement signed by 50 countries.“Ever-rising greenhouse gas emissions are supercharging extreme weather events across the planet. These increasing calamities cost lives and hundreds of billions of dollars in loss and damage. Three times more people are displaced by climate disasters than war.

来源：WMO

发布时间：2022-11-07

数据类型：资讯

https://public.wmo.int/en/media/press-release/early-warnings-all-action-plan-unveiled-cop27

13. Idealized 2D Cloud

Cloud is critical for planetary climate and habitability, but it is also one of the most challenging aspects of studying planets in and beyond the solar system. Here we use a cloud-resolving model (CRM) with high resolution (2 km) in a 2D configuration to simulate the clouds and circulation on tidally locked aquaplanets. We find that the substellar area is covered by deep convective clouds, the nightside is dominated by low-level clouds, and the two are linked by a global-scale Walker circulation. We further find that uniform surface warming causes the substellar cloud width to decrease, but a reduction in the day–night surface temperature contrast or an increase in the longwave radiative cooling rate causes the substellar cloud width to increase. These relationships can be roughly interpreted in accordance with simple thermodynamic theories. Comparing the results between the CRM and the global 3D general circulation model (GCM), we find that they are qualitatively consistent, including the Walker circulation, the substellar clouds, and the responses of the substellar ascending area and strength to changes in the surface temperature or in its zonal contrast. But large quantitative differences exist, such as the magnitude of the cloud water path, the cloud width, and their responses to external forcings. These results increase our confidence in using GCMs to model exoplanetary climates, although large quantitative uncertainties are always likely to exist.

来源：北京大学资讯

发布时间：2022-11-07

数据类型：资讯

https://www.atmos.pku.edu.cn/kxyj/kyjz/145176.htm

14. NC: 基于降水变率观测约束能够提高极端降水预估可靠性

摘要：近年来破纪录的极端降水和洪涝频繁袭击全球各地，如 2021 年东亚和欧洲的暴雨、2022 年巴基斯坦洪涝，都造成了严重的社会经济损失。气候变化应对需要准确可靠的气候预估信息，未来极端降水事件如何变化是一个众所关注的问题。然而，当前的气候模式预估结果尽管一致表明全球大部分地区极端降水将随未来增温而增强，但预估的极端降水定量变化却存在很大的不确定性，这制约了气候预估信息在实际决策中的应用。减少气候预估的不确定性难题需要厘清两大关键科学问题：一是寻找气候预估的不确定性来源；二是提出有效的约束方法来减少预估不确定性。近日，中国科学院大气物理研究所 LASG 国家重点实验室张文霞副研究员、周天军研究员、陈晓龙副研究员等与英国气象局学者合作，以“基于观测降水变率约束极端降水预估”为题在《自然—通讯》撰文，指出中高纬地区极端降水预估的模式间不确定性与模式模拟的历史气候态降水变率显著相关。基于这一发现，他们利用该约束关系、结合观测的降水变率，有效地减小了特定温升水平下极端降水预估结果的不确定性，减幅可达 20-40%。该研究工作利用多模式集合模拟，研究了特定全球温升水平下（如全球平均温升 2°C 或 3°C）极端降水频率变化的模式间预估不确定性，发现其与模式模拟的当前气候下的降水变率显著相关（注：这里的降水变率特指降水事件的波动幅度或振荡范围）。具体而言，对于同一个地区，若气候模式模拟的历史降水变率越小，则其预估的未来极端降水频率变化增加的越快。基于这一联系可建立极端降水预估的“涌现约束”（Emergent Constraint）关系，该方法在中高纬地区适用。“在基于气候模式结果建立涌现约束关系的基础上，我们需要进一步从理论上或物理上证实这一关系的合理性。

来源：大气物理所

发布时间：2022-11-07

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221107_6545285.html

15. Eight warmest years on record witness upsurge in climate change impacts

摘要：Sharm-El-Sheikh, Egypt 6 November (WMO) - The past eight years are on track to be the eight warmest on record, fuelled by ever-rising greenhouse gas concentrations and accumulated heat. Extreme heatwaves, drought and devastating flooding have affected millions and cost billions this year, according to the World

Meteorological Organization’s provisional State of the Global Climate in 2022 report.The tell-tale signs and impacts of climate change are becoming more dramatic. The rate of sea level rise has doubled since 1993. It has risen by nearly 10 mm since January 2020 to a new record high this year. The past two and a half years alone account for 10 percent of the overall rise in sea level since satellite measurements started nearly 30 years ago.2022 took an exceptionally heavy toll on glaciers in the European Alps, with initial indications of record-shattering melt. The Greenland ice sheet lost mass for the 26th consecutive year and it rained (rather than snowed) there for the first time in September.The global mean temperature in 2022 is currently estimated to be about 1.15 [1.

来源：WMO

发布时间：2022-11-06

数据类型：资讯

https://public.wmo.int/en/media/press-release/eight-warmest-years-record-witness-upsurge-climate-change-impacts

16. AOSL：2022 夏季罕见热浪破历史记录——日益增加的极端高温威胁

摘要：2022 年北半球经历了前所未有的炎热夏季，极端高温在欧亚和北美大陆持续蔓延，引起全世界的广泛关注。近期，中国科学院大气物理研究所陆日宇研究员、许可副研究员、中山大学陈锐丹副教授等在 Atmospheric and Oceanic Science Letters 上发表了一篇题为“Heat waves in summer 2022 and increasing concern regarding heat waves in general”的评论性论文，回顾了今夏的热浪事件以及近年来对极端高温的研究进展，并探讨了高温研究未来可能的发展方向。2022 年夏季，欧洲南部、西亚以及我国东部地区的气温异常高达年际标准差的两倍以上，多地气温屡屡突破历史极值。这些地区持续的热浪事件引发了严重的干旱和野火灾害。即使是位于我国长江上游，以水资源和水力发电著称的四川省，也遭遇了供电能力的大幅下跌，给当地人民的生活和生产力带来极大影响。而紧邻四川的重庆，日最高气温更是连续突破 40□达二十余天。

来源：大气物理所

发布时间：2022-11-04

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221104_6544628.html

17. Temperatures in Europe increase more than twice global average

摘要：Geneva, 2 November (WMO) _ Temperatures in Europe have increased at more than twice the global average over the past 30 years – the highest of any continent in the world. As the warming trend continues, exceptional heat, wildfires, floods and other climate change impacts will affect society, economies and ecosystems, according to a new report from the World Meteorological Organization (WMO).The State of the Climate in Europe report, produced jointly with the European Union's Copernicus Climate Change Service, focused on 2021. It provides information on rising temperatures, land and marine heatwaves, extreme weather, changing precipitation patterns and retreating ice and snow.Temperatures over Europe have warmed significantly over the 1991-2021 period, at an average rate of about +0.5 °C per decade. As a result, Alpine glaciers lost 30 meters in ice thickness from 1997 to 2021. The Greenland ice sheet is melting and contributing to accelerating sea level rise. In summer 2021, Greenland saw a melt event and the first-ever recorded rainfall at its highest point, Summit station.In 2021, high impact weather and climate events led to hundreds of fatalities, directly affected more than half a million people and caused economic damages exceeding US$ 50 billion.

来源：WMO

发布时间：2022-11-02

数据类型：资讯

https://public.wmo.int/en/media/press-release/temperatures-europe-increase-more-twice-global-average

18. 郭维栋教授研究团队揭示大规模毁林/造林对日际温度变率的影响

摘要：毁林（或造林）可以通过改变反照率和粗糙度等地表属性影响陆-气之间的动量、能量和水分交换，从而影响局地和区域气候，我们称该过程为生物物理过程。研究表明，毁林可以通过生物物理过程影响平均温度和极端温度。除平均值和极端值外，变率也是一个重要的统计量，它反映温度在不同时间尺度上的变化速度。特别是日际温度变率，它对生态系统功能、人类健康以及社会经济具有广泛的影响。大气科学学院符淙斌院士团队率先指出全球变暖下中国地区日际温度变率呈现快速变化的特征（Wu 等，2017），并在后续研究中发现日际温度变率的全球演变主要归因于人为温室气体强迫的作用（Xu 等，2020），以及日际温度变率能够超前主导冬季流感的季节性暴发，并大幅增加全球变暖下未来流感暴发的危险度（Liu等，2020）。然而，鲜有研究关注毁林对日际温度变率的影响，我们对此知之甚少。大气科学学院郭维栋教授团队及合作者利用第六次国际耦合模式比较计划

（CMIP6）及其子计划的模拟结果以及北美和欧洲 33 个通量站的观测资料，围绕毁林/造林对日际温度变率影响这一科学问题开展了系统的研究。基于理想化全球毁林试验的结果表明，北半球中高纬度地区毁林会导致局地日际温度变率显著升高，特别是在冬季。由此进一步导致骤暖或者骤冷事件发生的概率显著增加。该影响的主要物理机制是毁林降低地表粗糙度，增强近地面水平风速，同时中高纬度毁林的降温效应使得经向温度梯度增大，两者共同作用使得近地面水平温度平流增大，从而最终导致日际温度变率升高。

来源：南京大学

发布时间：2022-11-02

数据类型：资讯

https://as.nju.edu.cn/11/c5/c11323a594373/page.htm

19. SA: 气候变化背景下自然保护区缓冲增温为生物提供庇护

摘要：根据联合国生物多样性和生态系统服务政府间科学-政策平台（IPBES）最新出版的《生物多样性和生态系统服务全球评估报告》，气候变化是地球生物的主要威胁之一，且预计在今后的几十年，逐渐成为生物多样性的最大威胁。当气候变化导致温度超出物种的热耐受范围，一些物种出现衰落，甚至面临灭绝风险。研究表明，与经常受到扰动或由人类活动直接发生土地利用变化的非保护区相比，保护区内的自然或半自然植被覆盖能有效地降低地表温度。热带保护区内的日最高温度，寒带和温带保护区内的昼夜和季节温差均明显低于非保护区内。即使覆盖相同类型的植被，保护区内的植被冠层密度明显高于非保护区，更加完好的植被冠层通过生理和生物物理过程调节温度。自然保护作为应对气候变化的自然解决方案，可以有效地减少人类活动导致的土地利用变化相关的温室气体排放，并增强生态系统碳汇功能，从而助力应对气候变化目标的实现。该研究表明，自然保护在稳定局地气候方面的功能也不容小觑。受保护的森林能有效地减缓当地气候变暖的速率，并且在高纬度地区更加显著。受保护的北方森林区增温速率比周围非森林环境的增温速率低了近 20%。由于高纬度地区平均增温速率高于中低纬地区，保护区给高纬度地区的生物提供了有效的庇护所。

来源：大气物理所

发布时间：2022-11-02

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221102_6543209.html

20. JC: 晚夏中国东南地区极端干旱的形成：中纬度和热带环流系统耦合的视角

摘要：2019 年 8-10 月中国东南地区遭受了持续性的极端干旱，摧毁了大面积的农作物，造成了严重的经济损失，受到科学界的关注。已有的研究基于 8-9-10 月平均揭示了全球增暖、极端正印度洋偶极子和中部型厄尔尼诺对此次极端干旱事件的影响；也有研究表明极端正印度洋偶极子和中部型厄尔尼诺不是导致此次干旱事件的主要原因，强调了季节内振荡的作用。中国科学院大气物理研究所 LASG 国家重点实验室博士后姜继兰博士和所在团队吴国雄院士、刘屹岷研究员和李矜霄博士，联合福建省气候中心苏同华研究员和中山大学于威博士从中纬度和热带环流系统协同作用的视角揭示了 2019 年 8 月中国东南地区极端干旱的形成。（1）热带对流系统：强正印度洋偶极子和中部型厄尔尼诺通过沃克环流导致热带东南印度洋和海洋性大陆地区对流的抑制，该对流的抑制一方面通过局地经向环流和南亚地区对流加热水平梯度的热力效应，促进青藏高原南侧降水负异常以及高原上空准正压反气旋环流的发展。另一方面通过海洋性大陆地区下沉，菲律宾海附近上升的局地经向环流以及强南亚夏季风促进菲律宾海附近对流的发展，进而促进西北太平洋上低层气旋环流的发展。（2）中纬度环流系统：中高纬北大西洋三极型海温分布所激发的沿副热带西风急流传播的罗斯贝波和对高原南侧降水负异常的罗斯贝波响应，促进了我国东北地区准正压气旋的发展。（3）协同作用：我国东南沿海的低层气旋环流、东北地区的准正压气旋环流以及青藏高原上空的准正压反气旋环流的协同作用，导致我国东部地区从低层到高层整个受强北风气流的影响。强北风异常阻止了来自南方的暖湿水汽的输送以及抑制了中国东南地区对流的发展。（4）气候统计和多模式敏感性试验：文中还揭示了海洋性大陆地区对流和中国东南地区降水年际变率之间的显著相关关系，并表明高原南侧和菲律宾海附近对流异常在海洋性大陆地区降水异常影响中国东南地区降水的过程中起着重要的桥梁作用。以上结果得到线性斜压模式和 FGOALS-f2 大气环流模式敏感性试验的验证。

来源：大气物理所

发布时间：2022-11-02

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221102_6543388.html

21. LRH-WP: 未来气候和人口变化将共同导致中国区域热浪相关健康风险增加

摘要：近些年来，气候变化导致中国高温热浪出现频率和强度不断增加，这一现象可能还会持续。除此以外，中国未来还面临着城市化、老龄化、人口增长和流动等社会变迁，这些问题叠加将不断加剧高温热浪的健康危害。中国已经把积极应对气候变化作为国家经济社会发展的重大战略，力争于 2030 年前碳达峰、2060 年前碳中和，努力为实现《巴黎协定》提出的将全球升温幅度限制在 1.5°C 内的目标贡献力量。那么，在不同的气候变化和人口数量预测情景下，中国未来热浪归因死亡人数将如何变化？若采取更加严格的减排政策，又将获得怎样的健康收益？近日，中国科学院大气物理研究所赵亮高工和清华大学万科公共卫生与健康学院黄存瑞教授课题组及其合作团队在《柳叶刀-区域健康（西太平洋）》（The Lancet Regional Health – Western Pacific）上发表文章：“Projections of heatwave-attributable mortality under climate change and future population scenarios in China”）。该研究通过将气候区特异的暴露反应函数应用于热浪期间的死亡人数，预测了至本世纪末三种 RCP 排放情景下热浪相关死亡人数的规模，并分析了热浪相关死亡人数变化的驱动因素和不确定性来源。该研究发现，随着气候变化的加剧和中国人口的快速老龄化，即使在低排放（RCP2.6）情景下，热浪对中国人群的健康危害也将持续增加。然而，如果能实现 1.5°C 温升目标，预计会产生显著的健康收益。热浪相关死亡负担在不同的排放情景下有所差异。在 RCP8.5 下，热浪相关死亡人数将持续上升；在 RCP2.6 和 RCP4.5 下，热浪相关死亡人数在 2050 年左右将下降。到本世纪末，在 RCP8.5、RCP4.5 和 RCP2.6 下，热浪造成的年死亡人数预计将从基线期的 10,264（5,996–14,094）增长到 2090 年的 72,259（33,911–119,394）、35,025（16,834–59,865）和 20,303（9,153–34,179），相应地增加了 6.7、3.2 和 1.9 倍。

来源：大气物理所

发布时间：2022-11-01

数据类型：资讯

http://www.iap.cas.cn/gb/xwdt/kyjz/202211/t20221101_6543001.html