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Variations of Water Vapor Transports in Three Rivers' Headstream Region During 1971–2010

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Abstract: Based on the applicability analysis of the NCEP/NCAR reanalysis I data by the radiosonde data in the Three Rivers' Headstream region and the adjacent regions, trends of water vapor transports in the Three Rivers' Headstream region were analyzed by applying the daily wind and specific humidity of the reanalysis data during 1971–2010. The results show that the meridional water vapor input in the Three Rivers' Headstream region decreased significantly, causing the net water vapor budget decreasing. The decadal variations of water vapor fluxes in the 1970s and 1980s were relatively weaker than those in the 1990s and 2000s. During 1971–2010, the water vapor budget showed an obvious decreasing trend in spring, summer and autumn, while no significant trend in winter. Overall, the water vapor transport into the region decreased significantly, especially in June and September during 1971–2010, which had adverse impacts on precipitation formation.

Key words: water vapor transport; water vapor budget; Three Rivers' Headstream region

信息与动态

温室气体的作用不可小觑

对于南极冰芯记录资料, 全球变暖怀疑论者喜爱的一个简单解释是: 在全球走出上一个冰期的变暖进程中, 二氧化碳只起到了微弱的甚至无足轻重的作用。但是, 有关上个冰期结束时首个连续的、近乎全球的气温记录显示, 二氧化碳的确对全球变暖起到了促进作用。

有关南极冰芯的问题在于: 冰芯记录的气温上升早于二氧化碳浓度的上升。这是气候变暖怀疑论者质疑温室气体引起全球变暖的原因之一。

然而, 气候科学家们知道, 没有任何一个地区能够代表全球的气候趋势。因此, 哈佛大学的 Jeremy Shakun 及同事创建了一份全球气温记录。他们将过去 22000 多年的 80 多份气温记录资料结合起来, 这些资料是从全世界范围内检索到的, 在纬度上涉及的范围为从南极洲到格陵兰岛。七个种类记录资料中包括冰芯、花粉以及海洋沉积物中的微体化石。

将代表全球的气温记录资料结合在一起考虑可以发现, 二氧化碳浓度的升高早于气温的升高。Shakun 及同事在《自然》(Nature) 杂志上发表相关论文时提到, 南极洲的变暖先于二氧化碳浓度的上升是个转移人们注意力的话题。

为了搞明白为什么会这样, 研究人员利用了气候模型以及各种其他的气候记录资料。他们发现, 大北方的变化引起了最终到达南极洲的大洋环流和大气环流发生了自北向南的变化, 通常将热量带往北方的南大西洋洋流停止运行, 结果, 南极洲变暖了, 接下来二氧化碳继续使整个全球变暖了。

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