

南极麦肯齐湾冰间湖的时空变化及主要影响因素分析*

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摘要: 利用2003—2009年 AMSR-E 日平均海冰密集度数据, 对南极普里兹湾埃默里冰架前缘中西部的麦肯齐湾冰间湖进行了分析。针对冰架前缘冰间湖的特点, 本文在阈值法和连通域法的基础上, 提出了生长点法作为识别此类冰间湖的方法。研究发现, 该冰间湖的开始时间为每年的3月中下旬, 结束时间为每年的10月末到11月初, 平均出现天数为226 d。冰间湖的面积每天都发生变化, 表现出天气尺度的变化特征。全年累计的冰间湖面积平均为 $(8.33 \pm 1.55) \times 10^5 \text{ km}^2$ 。冰间湖最大面积为 $1.69 \times 10^4 \text{ km}^2$, 出现在2004年。结合NCEP再分析数据中的日平均风速资料的分析发现, 在6~8月, 冰间湖的天气尺度变化主要是受风场的影响, 冰间湖面积与离岸风速有很好的相关性。

关键词: 冰间湖; 海冰密集度; 风场; 麦肯齐湾; 南极

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Temporal and Spatial Variation of the Mackenzie Bay Polynya, Antarctica and Its Main Impact Factors

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Abstract: The Mackenzie Bay polynya at the western and central front of the Amery Ice Shelf in the Prydz Bay was studied by using daily AMSR-E sea ice concentration data from 2003 to 2009. According to the characteristics of the polynya at the front of the ice shelf, growing point method was proposed to identify such polynya based on threshold method and connected domain method. The study indicated that this polynya appeared in late March and ended in late October or early November each year, and the mean opening period was 226 days. Daily changed polynya area showed varied characteristics on synoptic scale. The mean annually accumulative polynya area was $(8.33 \pm 1.55) \times 10^5 \text{ km}^2$. The polynya maximum area was $1.69 \times 10^4 \text{ km}^2$, which occurred in 2004. Combined with daily NCEP reanalysis wind data, our analysis showed that the wind was a major cause for the synoptic variation of the polynya, for there was high correlation between polynya area and offshore wind speed from June to August.

Key words: polynya; sea ice concentration; wind; the Mackenzie Bay; Antarctica

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