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Formation of anabatic and katabatic winds

In such conditions, the adjacent air, gets very cold and dense, down at a speed that can reach gale force conditions. A wind that carries high-density air from a higher altitude down a slope below gravity Katabatic wind in AntarcticaA catalytic wind (named from the Greek word κατάβασις katabasis, which means descending) is a drainage wind, a wind that carries high-density air from a higher altitude down a slope below gravity. Such winds are sometimes also called autumn winds; spelling cabatic winds[1] are also used. Catastrophic winds can rush down elevated slopes at hurricane speeds, but most are not as intense as that, and many are 10 knots (18 km/h) or less. Not all downslope winds are cathartic. For example, winds such as föhn and chinook are rain-shading winds where air-driven uphill on the wind side of a mountain range, the humidity drops and goes down leek dries and warmer. Examples of true catapult winds include bora in the Adriatic Sea, bohemian winds or Bohmwind in the Ore Mountains, Santa Ana in southern California, piteraq winds in Greenland, and oroshi in Japan. Another example is Barber, an improved catalytic wind that blows over the town of Greymouth in New Zealand when there is a southeast current over the South Island. The barber has a local reputation for his cold. TheorySkisse of generation of catabatic winds in Antarctica A catabatic wind originates from radiation cooling of air on top of a plateau, a mountain, a glacier or even a hill. Since the density of air is inversely proportional to the temperature, the air will flow downwards, heating approximately adiabatically as it decreases. The temperature of the air depends on the temperature of the source area and the amount of descent. In the case of Santa Ana, for example, the wind (but not always) can get warm when it reaches sea level. In Antarctica, however, the wind is still intensely cold. The entire wind field near the surface above Antarctica is largely determined by the cataby wind, especially outside the summer season, except in coastal areas when storms can impose their own wind field. Consequences Coastal polynyas are produced in Antarctica by catabytic winds Cataastic winds are most often found blowing out from the large and elevated glaciers of Antarctica and Greenland. The build-up of high-density cold air over the glaciers and the elevation of the glaciers brings into the game enormous gravitational energy. Where these winds are concentrated in limited areas in coastal valleys, the wind blows well above the hurricane force,[2] reaching around 300 km/h. [3] In Greenland, these winds are called piteraq and are most intense when a low pressure area approaches the coast. In a few regions of continental Antarctica, the snow is soaked by the power of catapult wind, leading to dry valleys (or Antarctica oases) such as McMurdo Dry Since the catapult winds are sinking, they tend to have a low relative humidity, which dehydrates the region. Other regions may have a similar but smaller effect, leading to blue ice areas where the snow is removed and the surface ice sublimates, but is replenished by the glacier flow from upstream. In the Fuegian archipelago (Tierra del Fuego) in South America as well as in Alaska in North America, a wind known as a williwaw is a special danger of harboring ships. Williwaws originate in the snow and ice fields of the coastal mountains, and they can be faster than 120 knots (140 mph; 220 km/h). [4] See also Anabatic Wind Foehn Wind Valley Exit Jet Bora (Wind) Piteraq References ^ NASA Scope and Subject Category Guide. 7603. 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As the air warms up, the volume increases, thereby reducing the density and pressure. The air becomes relatively resilient and rises up the orographic slope (orographic lift), resulting in anabatic flow (or wind). Simplified diagram of anabatic flow as described </0738:SAOAKW> </0135:CSSOTA> </0135:CSSOTA> Text. Incoming solar radiation heats up the lower areas of the orographic surface andabatic flow is created. The relatively colder air is shifted, part of it travels downwards to fill the valley floor, and the process of heating by wire can begin again. Anabatic wind varies in intensity and occurrence; Generally anabatic wind is more pronounced in the summer season when the sun's warming is more intense, and the speed ranges from 10 to 30 knots. Predominantly a day time phenomenon, anabatic wind can flow longer than the orographic peaks, cooling as it rises vertically (convection), dry-adiabatically. If the air cools sufficiently to reach the dew point temperature of the air, the saturated air can condense the water vapor, resulting in mainly convector clouds. If the air is sufficiently unstable, cumulonimbus clouds can be produced, resulting in orographic thunderstorms. Depending on the relative position of the sun and the angle of the orographic surface of the sun, the sunny side of valleys is more prone to anabatic winds than the shady side, where relatively colder air can even flow down along the orographic slope, resulting in catatic winds. Pilots of small piston motor aircraft are advised to fly on the sunny side of valleys, especially at higher altitudes to avoid catastrophic winds. Related articles An Anabatic wind, from the Greek anabatos, verbal of anabainein means to move upwards, is a warm wind blowing up a steep slope or mountainside, driven by the warming of the slope through insolation. [1] It is also known as an uphill current. These winds usually occur during the day in calm sunny weather. A hill or mountain top will be radiatively warmed by the sun which in turn warms the air just above it. Air at a similar height above an adjacent valley or plain is not heated as much due to greater distance to the ground below it. The effect can be improved if the lower lying ground is shaded by the mountain and then gets less heat. The air above the hilltop is now warmer than the air at a similar height around it and will rise through convection. This creates a lower pressure area where the air at the bottom of the slope flows, causing the wind. It is common for the air rising up from the top of large mountains to reach a height where it cools adiabatically to below the dew point and forms cumulus clouds. These can then produce rain or thunderstorms. [2] Anabatic winds are particularly useful for hovering glider pilots who can use them to increase the aircraft's altitude. Anabatic winds can be detrimental to the maximum downhill speed of cyclists. Conversely, catapulted winds down-slope wind, often produced at night by the opposite effect, the air near the ground loses heat to it faster than air at a similar altitude above adjacent low-lying land. Monsoon winds are generated in the same way, but on a continental scale and seasonal cycle. See also breeze and valley breeze References ^ Marine Meteorological Glossary Archived December 11, 2008, on Wayback Machine ^ a b American Meteorology Society Glossary. Archived from the original on 26 February 2010. In 2009, the American Viders Folke-Vig soma.com (1949) This climatology-related article is a stub. You can help Wikipedia by expanding it.vte Retrieved from

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