Isotherm Encyclopedia Article

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Isotherms are lines that connect points of equal **temperature** on **weather** maps, so at every point along a given isotherm the temperature values are the same. The word originates from Greek, where *isos* means equal and *therm* means heat. Isotherms are created from regularly scheduled, simultaneous temperature readings at different locations. For a proper comparison between the observation places, the measured temperature values are corrected for each location as if it was located at sea level. Isotherms help to visualize and interpret the horizontal temperature distribution of an **area** by showing patterns of temperature on a weather or **oceanography** map. Constructing a map of isotherms is an elementary step in temperature data analysis, and the process in general is called contouring. It can also be done for other parameters such as barometric pressure (**isobars**), geopotential height (isohypses), **dew point** temperature (isodrosotherms), **wind** speed (isotachs), and salinity (isohalines).

Isotherms are always smooth, labeled with the values, and mostly parallel to each other. Although the interval between the isotherms is arbitrarily chosen, within the same map it is a constant, and usually a round value. The value is selected such that the contour map both contains enough contours to show the patterns, and yet it is not crowded with too many lines. Because data is available only in the temperature observation points, interpolation should be used to create the isotherms between the measurement points. On the other hand, extrapolation to areas where no data is available is not acceptable. An isotherm should never split, cross, or touch another isotherm, because then at the crossing point it would have two different temperature values, which is physically impossible. Sometimes, contour maps are enhanced using color filling, when the area between pairs of isotherms is filled with special colors, so a particular color denotes the range of values between the two temperature values.

The relative spacing of the isotherms indicates the temperature gradient, the amount by which the temperature values vary across each unit of horizontal distance, in a direction perpendicular to the isotherms. The gradient is larger where the isotherms are closer. From the contour maps, areas of large gradient (regions where the temperature is changing quickly), as well as flat fields (regions where the temperature variation is not much) can be easily identified.

See Also

Isobars; Temperature and Temperature Scales