

# The great aurora of January 18, 1770

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## Resumen

El desarrollo de la gran aurora del 18 de enero de 1770 ha sido discutida en un artículo fundamental por Silberschlag y otros autores. La aurora fue observada en latitudes medias y bajas, y por supuesto en latitudes altas. En Europa central ésta presentó todas las formas típicas de aurora, incluyendo la Corona. Basados en los viejos escritos originales, se recrea el desarrollo de esta aurora.

## Palabras clave:

## Abstract

The development of the great aurora of January 18, 1770 has been discussed in a fundamental paper by Silberschlag and other authors. The aurora was observed in middle and low latitudes and of course in northern latitudes. In Central Europe it displayed all typical auroral forms, including the Corona. From original old accounts, the development of this aurora is traced.

**Key words:** Aurora, historical aurorae, auroral records, magnetism and auroras.

## Introduction

In the past some extraordinary auroras have been observed in middle and low latitudes. Reports are known from accounts dating from ancient times up to now. A most interesting aurora was that in January 1770 which has been described in detail by Silberschlag (1770). From his accounts and other sources (e.g., Fritz, 1873), the development of the aurora in the northern hemisphere, can be traced.

## The observations

### *a) Geographic distribution*

The aurora was observed over the whole northern hemisphere from East Asia to North America. The southern limit included Northern Africa, Spain, Italy and Greece.

Observations were made in Middle Europe (France, Germany, Switzerland, Austria, Hungary). In Denmark and Scandinavia intense auroral forms were detected. Some observations were also received from northern America.

### *b) Forms*

The aurora showed all typical forms: the arc, rays (including rapid rays), patches, and the corona. The corona is very seldom seen in middle latitudes, and is better known from more northern observations.

### *c) Colours*

The colours were reported as intense red (Middle Europe), violet, and changing from white to red. Rapid changes, well-known in auroras, were also noted.

## Solar data

The relevant solar maxima were 1761.5, 1769.7 and 1778.4. The minima were in 1766.5 and 1775.5. It is of interest that the great aurora appears before the Dalton minimum.

## Other observations

On the night of January 17 a further great aurora was observed in Germany (Fritz, 1873). The aurora of January 21 was also very big, and showed intense red colours, typical of auroras observed from middle latitudes.

## Magnetism and Auroras

Silberschlag's remarks on the relationship between magnetism and the appearance of auroras are significant. Before the 18th century, auroras and other mysterious sky phenomena were interpreted as ominous signs of God. A change in this thinking began with the great aurora of 1716 after which Christian Wolff delivered a public lecture declaring that all such phenomena can be explained as natural physical processes in the Earth's atmosphere.

Silberschlag referred to various sources in which a connection between geomagnetism, as exhibited by variation in the magnetic needle, and occurrence of aurora were demonstrated. He emphasised that auroras were natural phenomena subject to the influence of the geomagnetic field, and were not therefore signs of God.

A clear relationship to solar activity was not appreciated in the 18th century. This came later with the auroras of the 19th century as interpreted by Alexander von Humboldt, and later by Hermann Fritz, Rudolf Wolf, Johann K.F. Zöllner, Eugen Goldstein, Emil Wiechert and others (for details see: Schröder, 1984).

We can conclude that in the 18th century a new insight began into the nature of auroras as fundamentally natural physical phenomena of the Earth's atmosphere.

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