XY709

Different states of the transient luminous phenomena in Hessdalen valley, Norway

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The transient luminous phenomena's in Hessdalen valley has at least been observed for 200 years. The valley is located in the middle of Norway, isolated and with sub arctic climate. The former mining district has no more than 140 inhabitants, and the deep mines are closed and filled with water. The valley has been under scientific surveillance since 1998 when the first automated and remote controlled observatory was put into action. Today a Norwegian, Italian and French collaboration runs 3 different research stations inside the valley. Each year a scientific field campaign establishes 4 temporary bases in the mountains, and up to 100 students and researchers man these bases for up to 14 days in september when the moon is down, and approximately only 20 observations is done each year. The work done the last 14 years suggests that the phenomenon has different states, at least 6 detected so far. The states are so different that to see a coupling between them is difficult. New work done into dusty plasma physics suggest that the different phenomena's may be of the same origin, since the ionized grains of dusty plasma can change states from weakly coupled (gaseous) to crystalline, altering shape/formation and leading to different phenomena. Optical spectrometry from 2007 suggested that the luminous phenomena consisted of burning air and dust from the valley. Work done by G.S Paiva and C.A Taft suggests that radon decay from closed mines may be the mechanism that ionizes dust and triggers this phenomena. The 6 different main states of the Hessdalen phenomena, Doublet, Fireball, Plasma ray, Dust cloud, Flash and Invisible state is described and discussed. Investigation of the atmosphere inside the Hessdalen valley with low frequency directional RADAR, reveals large areas of ionized matter, giving a reflecting area big enough to saturate the input of the radar receiver. Together with long living time, ground analysis and radio active measurements, do not support the radon decay theory, and other forms of ionizing mechanisms must be investigated. The phenomenon's energy source is still not revealed, and the question of internal or external power source is also unexplained.

1 – Dust cloud

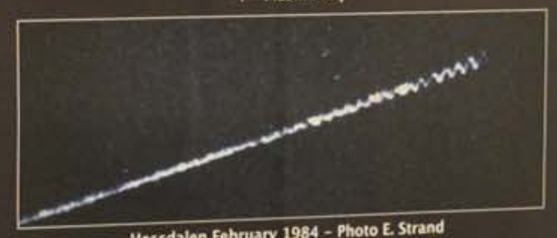
2 – Fire ball

3 – Doublett

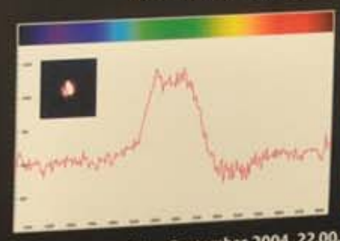
Dust cloud southt in Hessdalen September 2004, 04:15.
3D Intensity plot of dust cloud showed to the left.
Camera Cannon A1 ISO 800, lens 50 mm f1,8, exposure time 30 sec.

Hessdalen September 2004, 04:30. Photo shot from the Rogne mountain toward south west.
Camera Cannon A1 ISO 800, lens 50 mm f1,8, exposure time 30 sec.
Hessdalen Phonomena seen in 4 different states.

4 – Plasma Ray



Hessdalen February 1984 – Photo E. Strand



Element	Emission lines (Å)		
N1	5281	5674	5829
N2	5535	5927	5932
N3	5314		
O1	5435	5438	5577
O2	5502		
SC1	5349	5414	5724
SC2	5657		
HE1	5875		
FE1	5405	5618	
SI2	5405	5486	5488

Hessdalen September 2004, 22.00. Optical spectrum
of phenomena shows tracks of burning air and dust.
Camera Cannon A1 ISO 800, lens 50 mm f1,8, exposure time 30 sec.