
science @ NASA

1
00:00:09,910 --> 00:00:06,630
an early start for noctilucent clouds

2
00:00:11,669 --> 00:00:09,920
presented by science at nasa

3
00:00:13,669 --> 00:00:11,679
every summer something strange and

4
00:00:14,549 --> 00:00:13,679
wonderful happens high above the north

5
00:00:16,790 --> 00:00:14,559
pole

6
00:00:19,510 --> 00:00:16,800
ice crystals begin to cling to the smoky

7
00:00:21,590 --> 00:00:19,520
remains of meteors forming electric blue

8
00:00:24,710 --> 00:00:21,600
clouds with tendrils that ripple

9
00:00:28,710 --> 00:00:24,720
hypnotically against the sunset sky

10
00:00:30,870 --> 00:00:28,720
noctilucent clouds also known as nlcs

11
00:00:33,270 --> 00:00:30,880
are a delight for high latitude sky

12
00:00:35,510 --> 00:00:33,280
watchers and around the arctic circle

13
00:00:37,750 --> 00:00:35,520

their season of visibility is always

14
00:00:40,709 --> 00:00:37,760
eagerly anticipated

15
00:00:42,229 --> 00:00:40,719
news flash this year nlcs are getting an

16
00:00:44,709 --> 00:00:42,239
early start

17
00:00:46,869 --> 00:00:44,719
nasa's aim spacecraft which is orbiting

18
00:00:50,389 --> 00:00:46,879
earth on a mission to study noctilucent

19
00:00:53,029 --> 00:00:50,399
clouds started seeing them on may 13th

20
00:00:54,950 --> 00:00:53,039
the 2013 season is remarkable because it

21
00:00:57,029 --> 00:00:54,960
started in the northern hemisphere a

22
00:00:59,750 --> 00:00:57,039
week earlier than any other season that

23
00:01:01,910 --> 00:00:59,760
aim has observed reports cora randall of

24
00:01:04,469 --> 00:01:01,920
the laboratory for atmospheric and space

25
00:01:06,630 --> 00:01:04,479
physics at the university of colorado

26
00:01:07,990 --> 00:01:06,640
this is quite possibly earlier than ever

27
00:01:10,149 --> 00:01:08,000
before

28
00:01:12,550 --> 00:01:10,159
for sky watchers this means it's time to

29
00:01:14,950 --> 00:01:12,560
pay attention to the sunset sky where

30
00:01:16,789 --> 00:01:14,960
nlcs are most often seen

31
00:01:18,550 --> 00:01:16,799
an early start could herald brighter

32
00:01:20,230 --> 00:01:18,560
clouds and wider visibility than

33
00:01:22,230 --> 00:01:20,240
previous years

34
00:01:24,550 --> 00:01:22,240
noctilucent clouds were first noticed in

35
00:01:26,870 --> 00:01:24,560
the mid 19th century after the eruption

36
00:01:28,469 --> 00:01:26,880
of super volcano krakatoa

37
00:01:31,030 --> 00:01:28,479
volcanic ash spread through the

38
00:01:33,109 --> 00:01:31,040

atmosphere painting vivid sunsets that

39
00:01:34,149 --> 00:01:33,119
mesmerized observers all around the

40
00:01:36,630 --> 00:01:34,159
world

41
00:01:38,310 --> 00:01:36,640
that was when the nlcs appeared

42
00:01:41,030 --> 00:01:38,320
at first people thought they must be

43
00:01:43,109 --> 00:01:41,040
some side effect of the volcano but long

44
00:01:45,590 --> 00:01:43,119
after krakatoa's ash settled the

45
00:01:47,990 --> 00:01:45,600
noctilucent clouds remained they've been

46
00:01:50,789 --> 00:01:48,000
with us ever since says randall

47
00:01:53,270 --> 00:01:50,799
not only that they're spreading

48
00:01:55,350 --> 00:01:53,280
when aim was launched in 2007 the

49
00:01:56,469 --> 00:01:55,360
underlying cause of nlcs was still

50
00:01:58,310 --> 00:01:56,479
unknown

51
00:02:00,069 --> 00:01:58,320
researchers knew they formed 83

52
00:02:02,550 --> 00:02:00,079
kilometers above earth's surface where

53
00:02:04,389 --> 00:02:02,560
the atmosphere meets the vacuum of space

54
00:02:06,870 --> 00:02:04,399
but that's about all

55
00:02:08,630 --> 00:02:06,880
aim quickly filled in the gaps

56
00:02:11,270 --> 00:02:08,640
it turns out meteoroids play an

57
00:02:13,190 --> 00:02:11,280
important role in the formation of nlcs

58
00:02:15,350 --> 00:02:13,200
explains hampton university professor

59
00:02:16,869 --> 00:02:15,360
james russell the principal investigator

60
00:02:18,710 --> 00:02:16,879
of aim

61
00:02:21,350 --> 00:02:18,720
throughout the year meteors disintegrate

62
00:02:24,470 --> 00:02:21,360
in the upper atmosphere leaving behind a

63
00:02:26,309 --> 00:02:24,480

haze of smoky debris during summer when

64
00:02:29,110 --> 00:02:26,319
the upper atmosphere is ironically

65
00:02:31,670 --> 00:02:29,120
coldest water molecules waft up from the

66
00:02:33,430 --> 00:02:31,680
earth below and form ice crystals around

67
00:02:37,350 --> 00:02:33,440
the meteor smoke

68
00:02:39,589 --> 00:02:37,360
this is what makes noctilucent clouds

69
00:02:42,309 --> 00:02:39,599
back in the 19th century nlcs were

70
00:02:45,030 --> 00:02:42,319
confined to high latitudes you had to go

71
00:02:46,790 --> 00:02:45,040
to alaska or scandinavia to see them in

72
00:02:49,270 --> 00:02:46,800
recent years however they've been cited

73
00:02:50,869 --> 00:02:49,280
as far south as utah colorado and

74
00:02:52,470 --> 00:02:50,879
nebraska

75
00:02:55,830 --> 00:02:52,480
some researchers believe that the spread

76
00:02:57,430 --> 00:02:55,840
of nlcs is a sign of climate change

77
00:02:58,869 --> 00:02:57,440
one of the greenhouse gases that has

78
00:03:00,710 --> 00:02:58,879
become more abundant in earth's

79
00:03:02,149 --> 00:03:00,720
atmosphere since the 19th century is

80
00:03:06,229 --> 00:03:02,159
methane

81
00:03:08,229 --> 00:03:06,239
upper atmosphere it is oxidized by a

82
00:03:10,790 --> 00:03:08,239
complex series of reactions to form

83
00:03:12,710 --> 00:03:10,800
water vapor says russell this extra

84
00:03:15,270 --> 00:03:12,720
water vapor is then available to grow

85
00:03:17,430 --> 00:03:15,280
ice crystals for nlcs

86
00:03:19,270 --> 00:03:17,440
the early start of the 2013 season

87
00:03:22,070 --> 00:03:19,280
appears to be caused by a change in

88
00:03:23,430 --> 00:03:22,080

atmospheric teleconnections

89
00:03:26,149 --> 00:03:23,440
half a world away from where the

90
00:03:27,430 --> 00:03:26,159
northern nlcs are forming strong winds

91
00:03:29,270 --> 00:03:27,440
in the southern stratosphere are

92
00:03:31,190 --> 00:03:29,280
altering global circulation patterns

93
00:03:32,869 --> 00:03:31,200
explains randall

94
00:03:34,949 --> 00:03:32,879
this year more water vapor is being

95
00:03:37,670 --> 00:03:34,959
pushed into the high atmosphere where

96
00:03:39,509 --> 00:03:37,680
nlcs love to form and the air there is

97
00:03:41,110 --> 00:03:39,519
getting colder

98
00:03:43,589 --> 00:03:41,120
all of this has come as an interesting

99
00:03:45,270 --> 00:03:43,599
surprise for us notes russell when we

100
00:03:48,149 --> 00:03:45,280
launched aim our interest was in the

101
00:03:49,990 --> 00:03:48,159
clouds themselves but now nlcs are

102
00:03:51,990 --> 00:03:50,000
teaching us about connections between

103
00:03:55,190 --> 00:03:52,000
different layers of the atmosphere that

104
00:03:56,869 --> 00:03:55,200
operate over great distances

105
00:03:58,949 --> 00:03:56,879
our ability to study these connections

106
00:04:01,589 --> 00:03:58,959
will surely lead to new understanding

107
00:04:04,070 --> 00:04:01,599
about how our atmosphere works

108
00:04:06,229 --> 00:04:04,080
this year researchers get a head start

109
00:04:08,390 --> 00:04:06,239
noctilucent clouds are back

110
00:04:10,470 --> 00:04:08,400
earlier than ever