# Cities affect the night up to 300 km distance

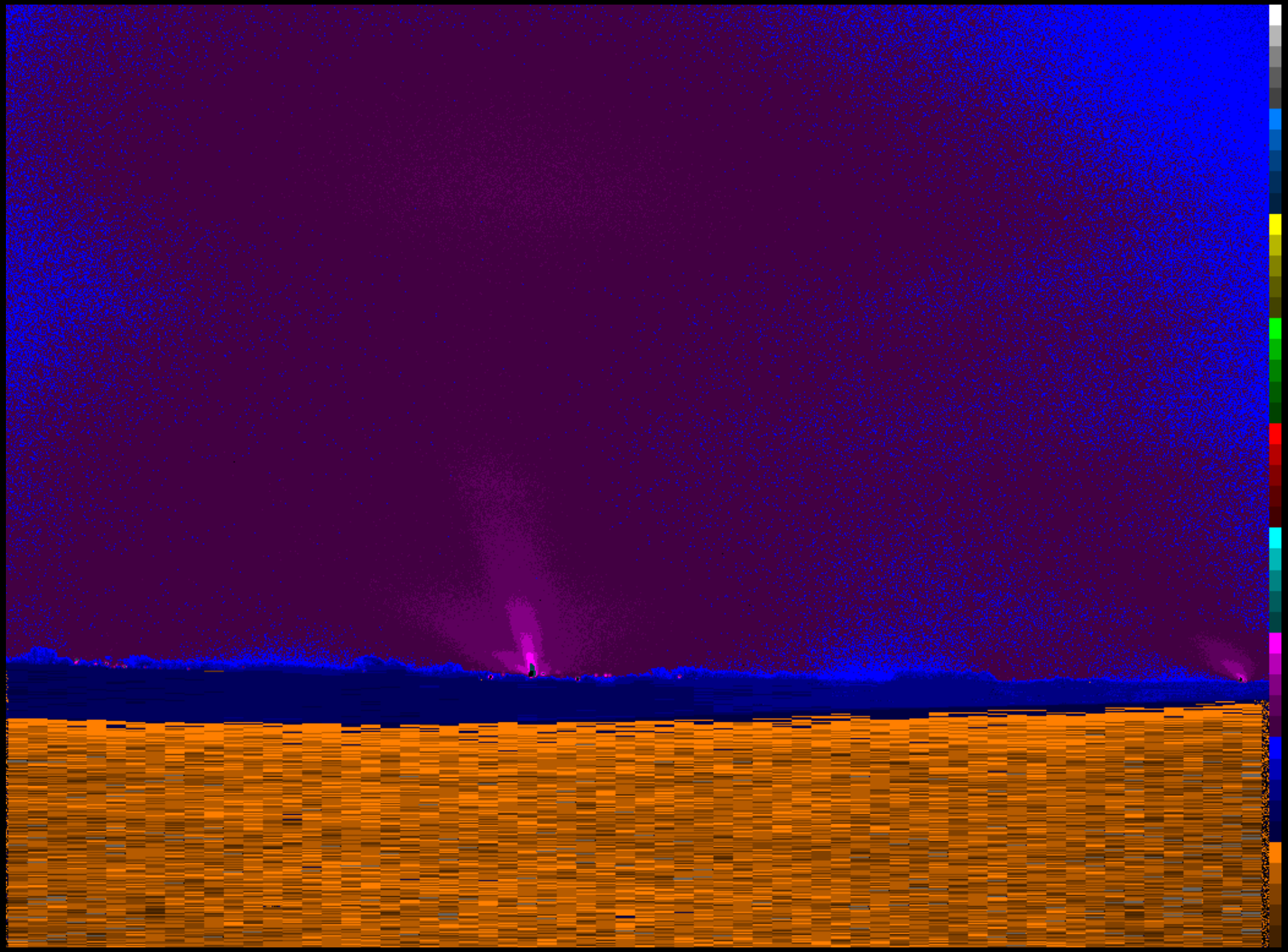
Jan Hollan, IDA Czech Section

Symposium for the Protection of the Night Sky, Bled, Oct 2007

Light spreads quickly and far...

... and some disperses as it travels through the air

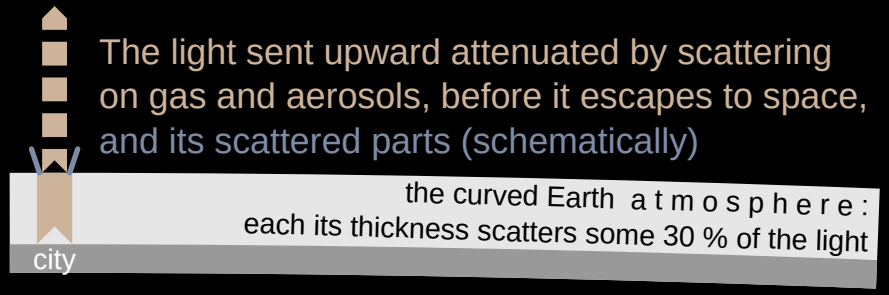
Anonymous Czech (celestial) churches:



# Why the sky over your town and even far from it glows so much?

When the light from lamps or illuminated surfaces goes:

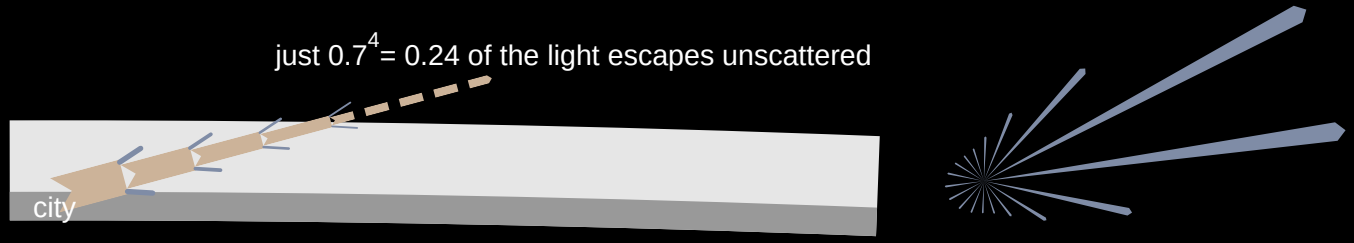
@ 90 degrees upwards:
30 % scatters,
from 28 % downwards,
altogether it returns down just
**8 %** of such light,



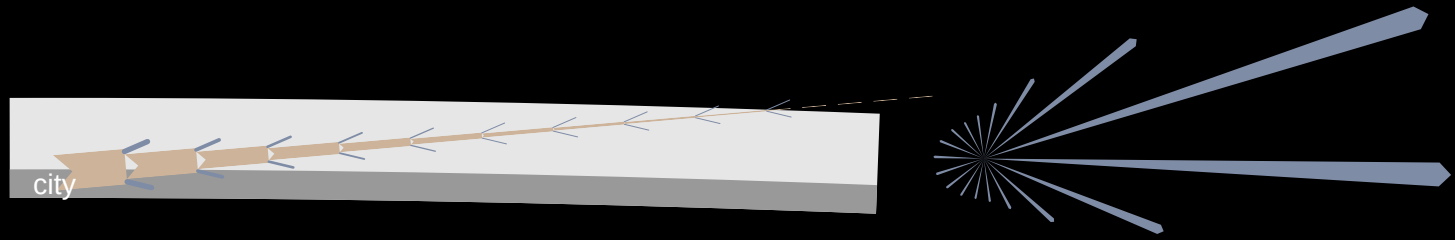

The light sent upward attenuated by scattering on gas and aerosols, before it escapes to space, and its scattered parts (schematically)

Sum of the light scattered by the air
and its true directions
– mostly similar
to the original direction

@ 15 degrees upwards:
76 % scatters,
from 40 % downwards,
altogether it returns down
**31 %** of such light,




@ 5 degrees upwards:
97 % scatters,
from 45 % downwards,
altogether it returns down
**45 %** of such light.



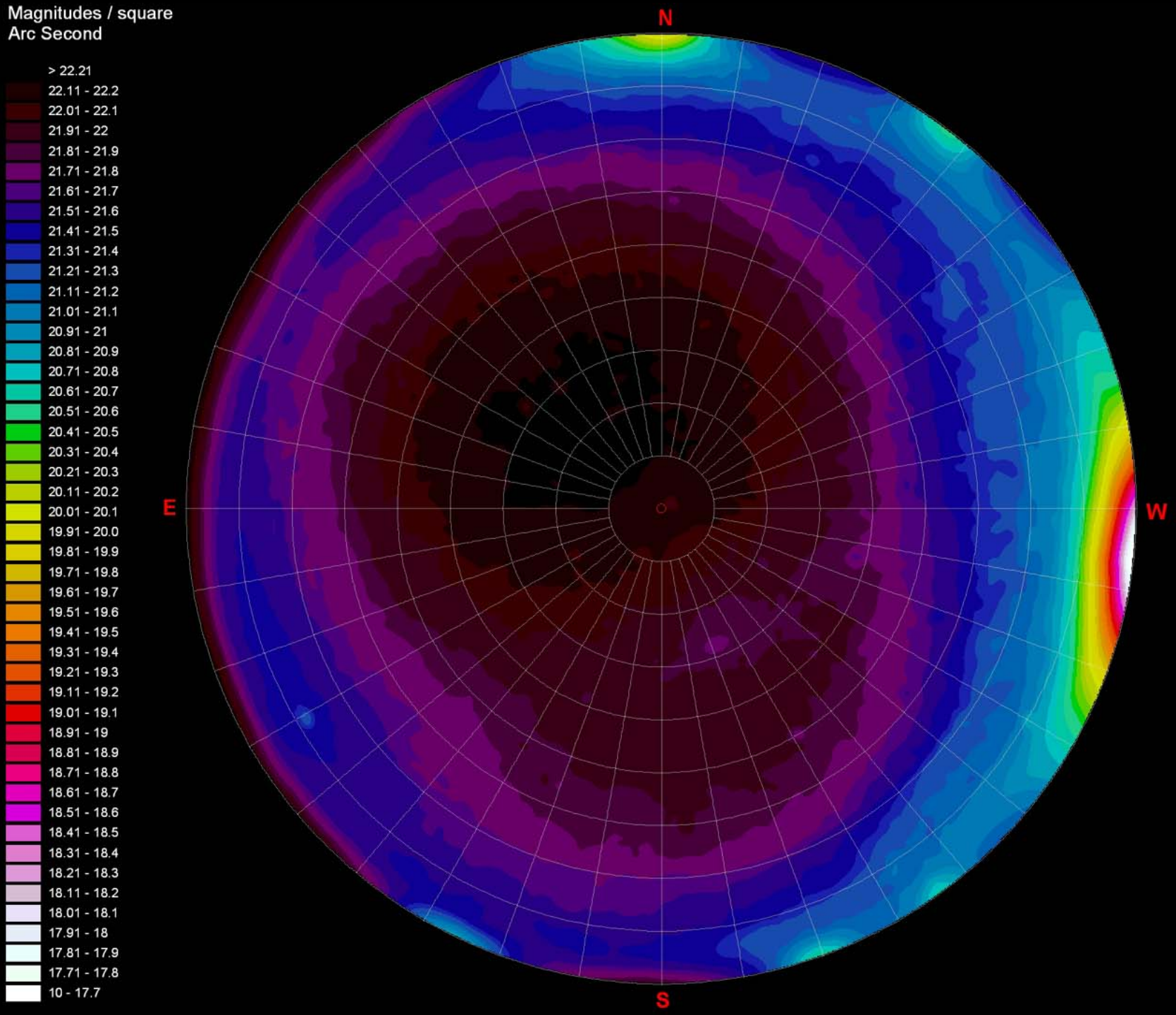

Which of the cases given above contributes most to the skyglow, in your opinion?

National Park Service Night Sky Team (USA)

documents the views from most abandoned sites since 2002

Mc Donald Flat, Parashant Nat. Monument, Arizona

is 150 km from Las Vegas:


Magnitudes / square
Arc Second
> 22.21
22.11 - 22.2
22.01 - 22.1
21.91 - 22
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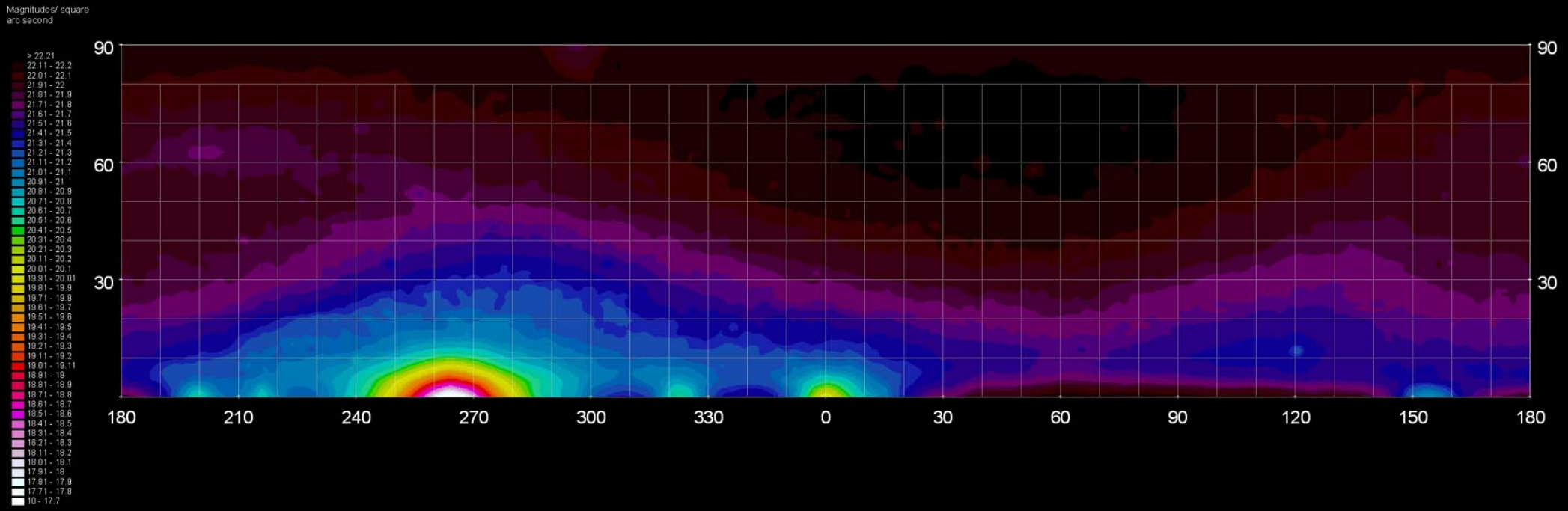
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10 - 17.7
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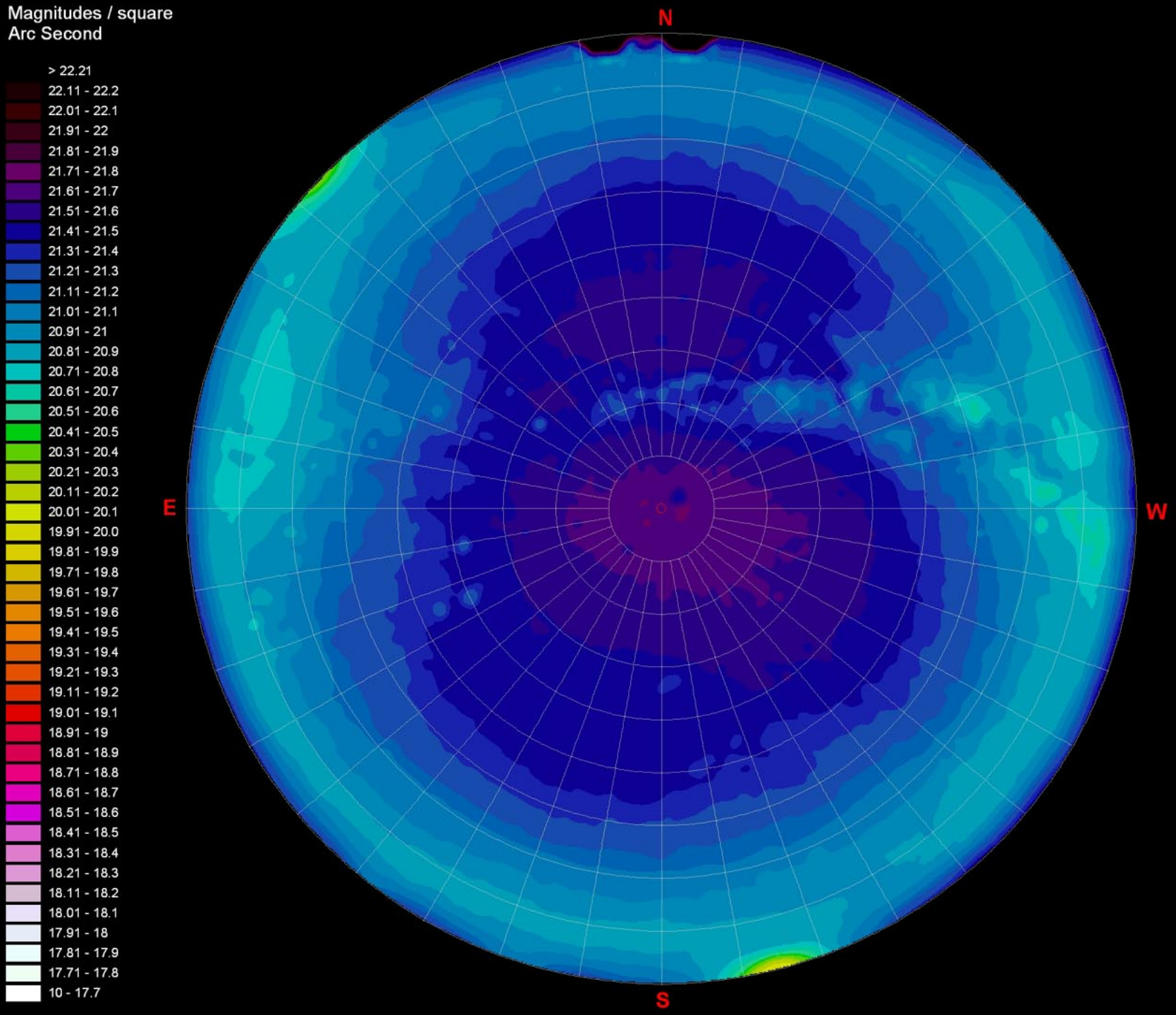
180
210
240
270
300
330
0
30
60
90
120
150
180

Mt Washington, Great Basins NP, Nevada

is 300 km from Las Vegas: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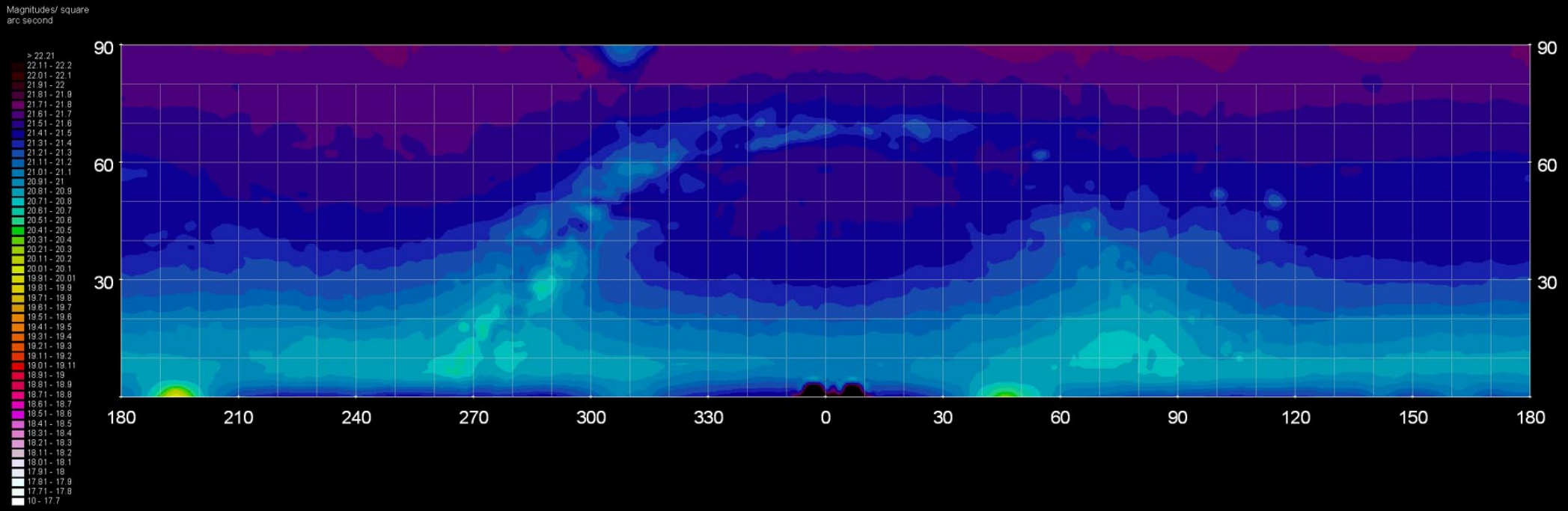
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To make even remote sites natural again

near-horizontal emissions from cities should become zero

and intensities of illumination reduced.