

A Sixteen Year Record of Global Natural Gas Flaring Derived From Satellite Data

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Flaring is a widely used practice for the disposal of “associated gas” at oil production facilities in remote locations and poor countries.

While flaring is a waste and there are technologies to make use of the gas, flaring is still better than venting.



Article

A Fifteen Year Record of Global Natural Gas Flaring Derived from Satellite Data

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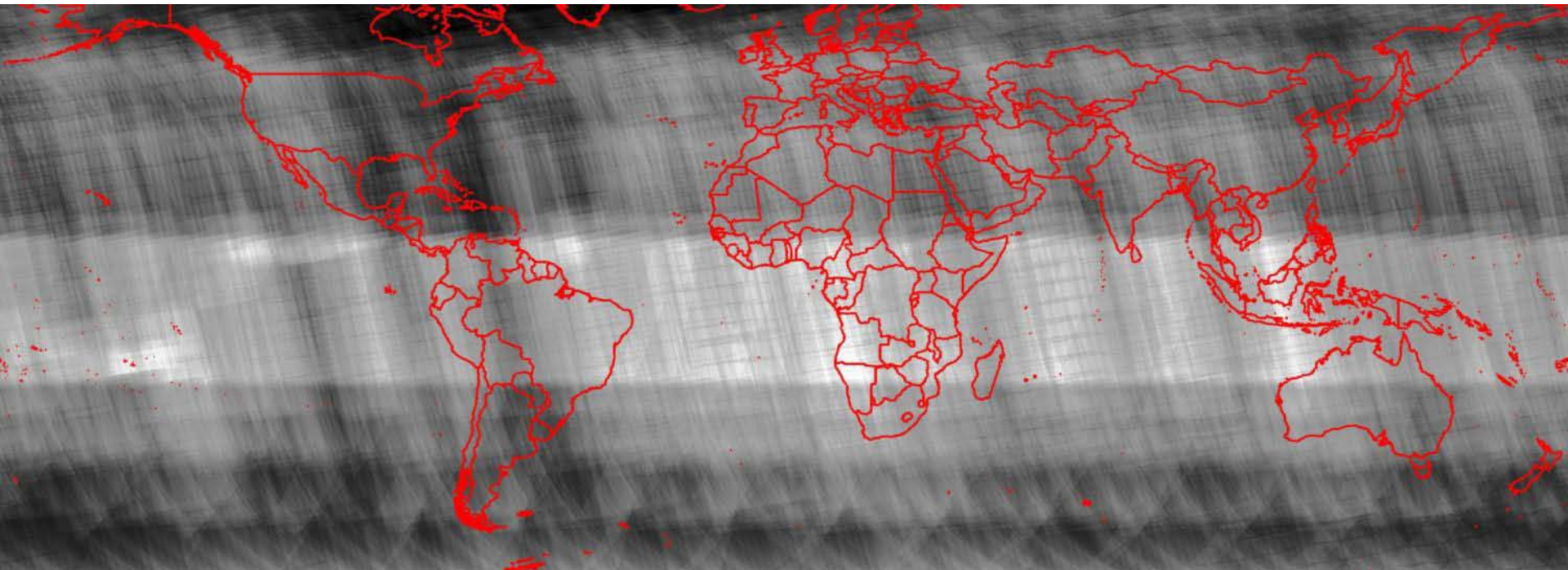


Visible

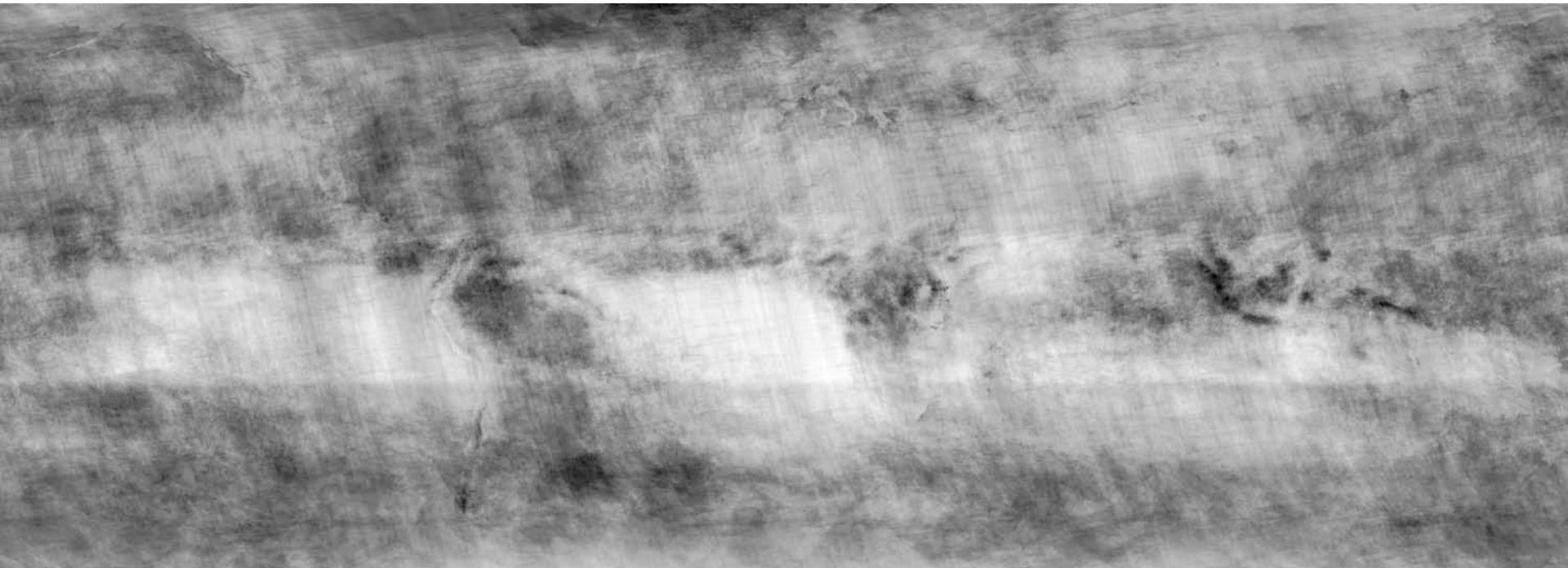
Thermal

The U.S. Air Force
Defense Meteorological
Satellite Program (DMSP)
Operational Linescan
System (OLS) has a
Unique capability to
collect low-light imagery.

Polar orbiting
3000 km swath
2.7 km ground sample
distance (GSD)
Two spectral bands:
visible and thermal
Nightly global coverage
Flown since 1972
Will continue till ~2012



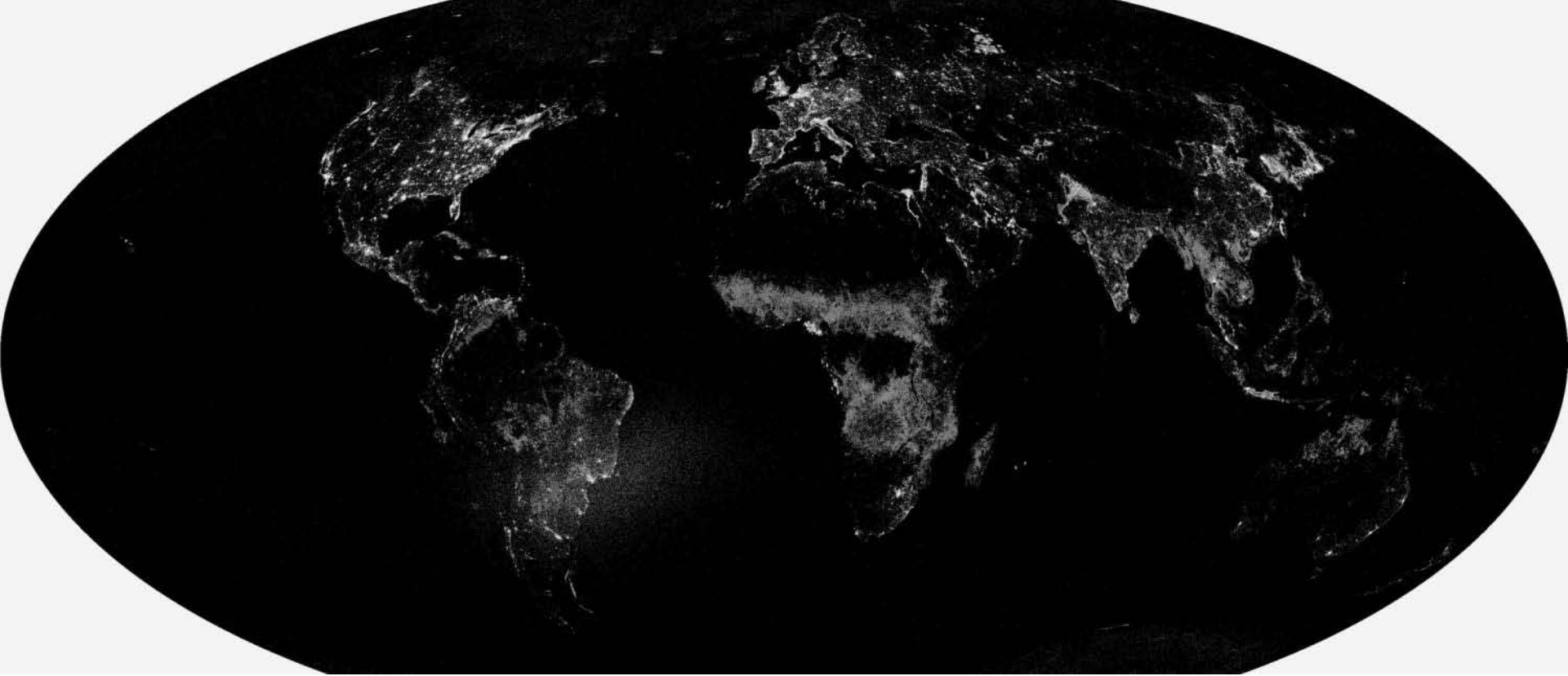
Total Number of Coverages



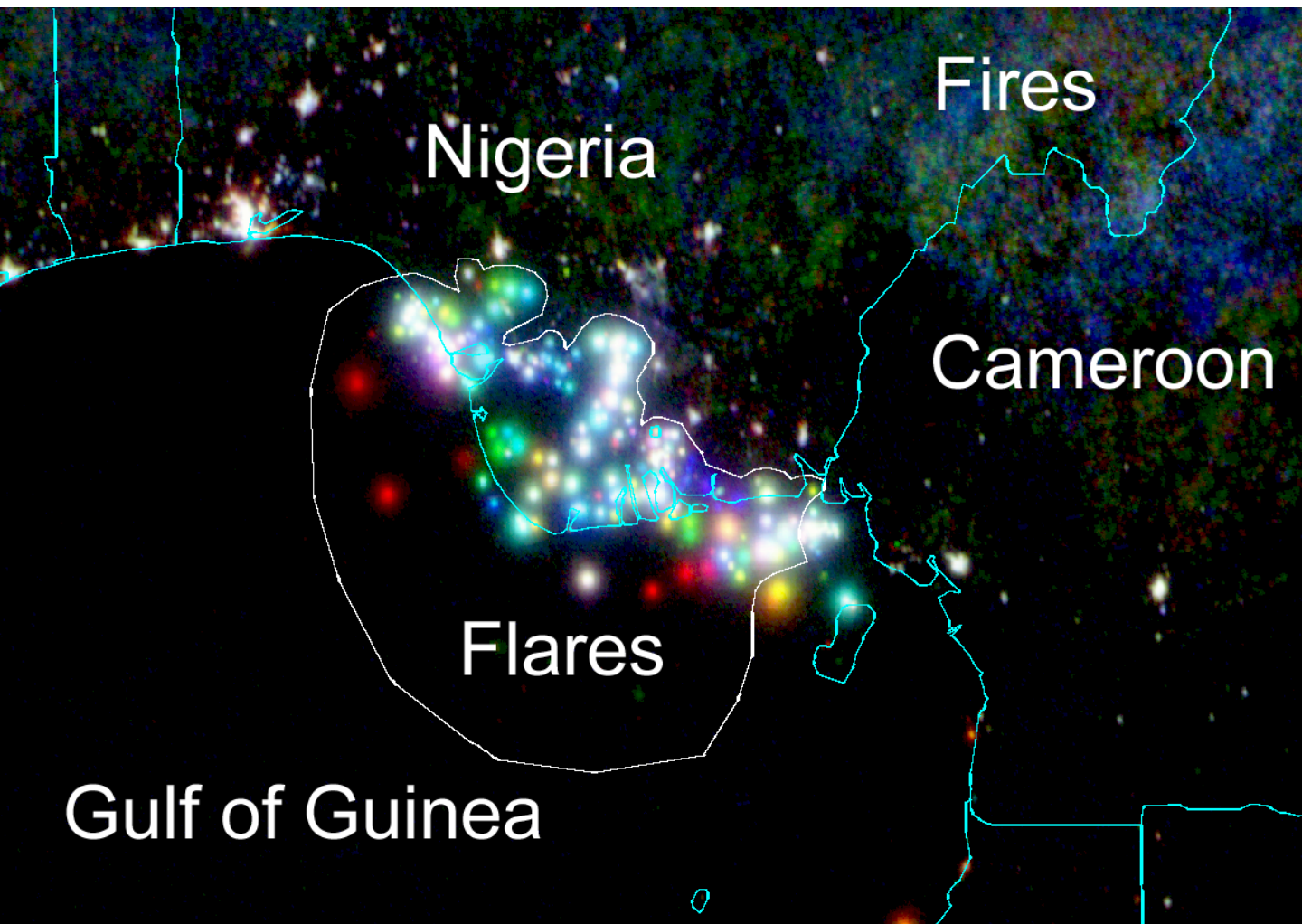
Total Number of Cloud-Free Coverages



Average Digital Number of Lights x Percent Frequency of Detection



Mollweide Projection – 1 km Equal Area Grid
Average Digital Number of Lights x Percent Frequency of Detection



Nigeria

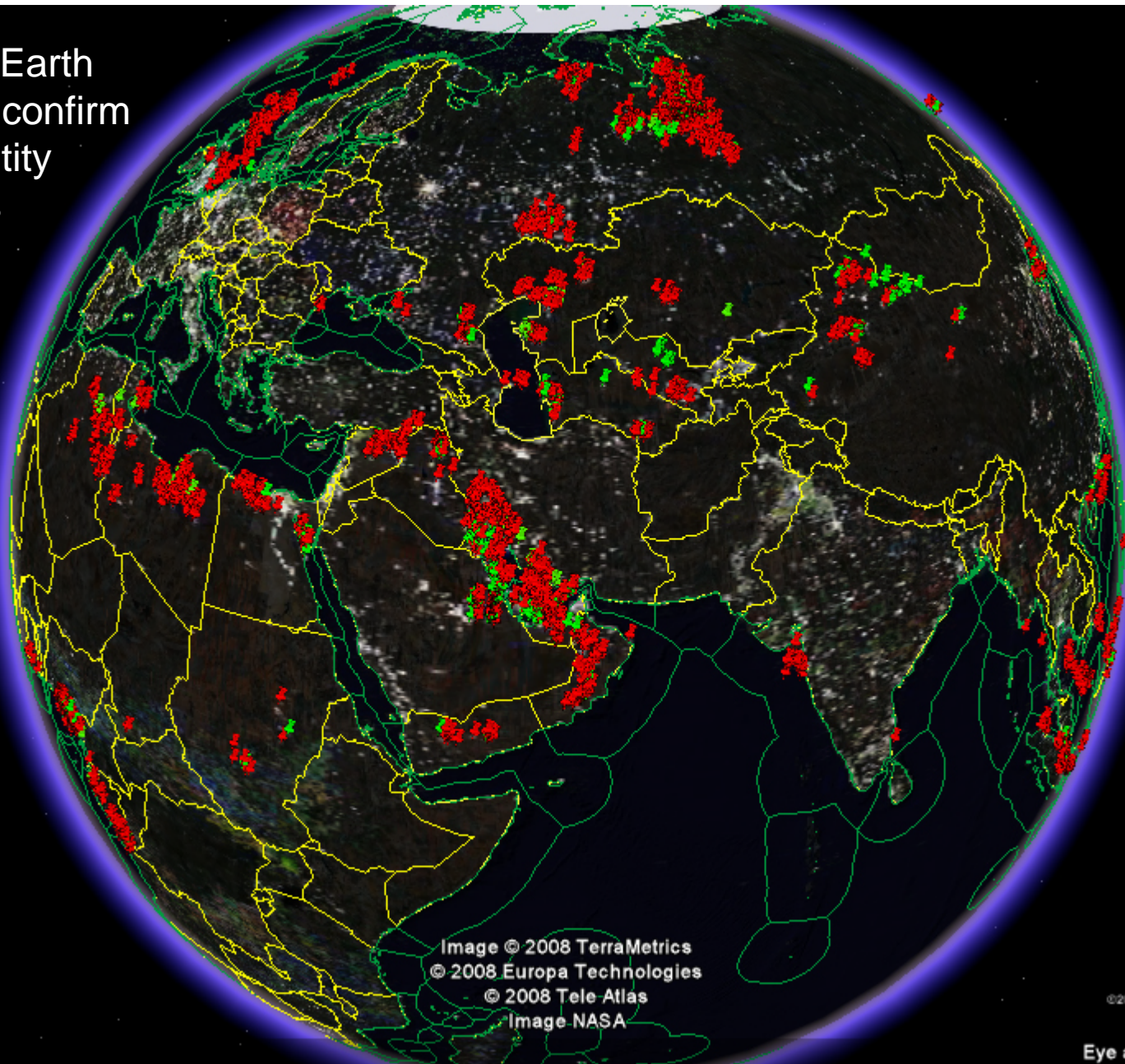
F162004 = Red
F141998 = Green
F101992 = Blue

Vectors drawn on
gas flares.

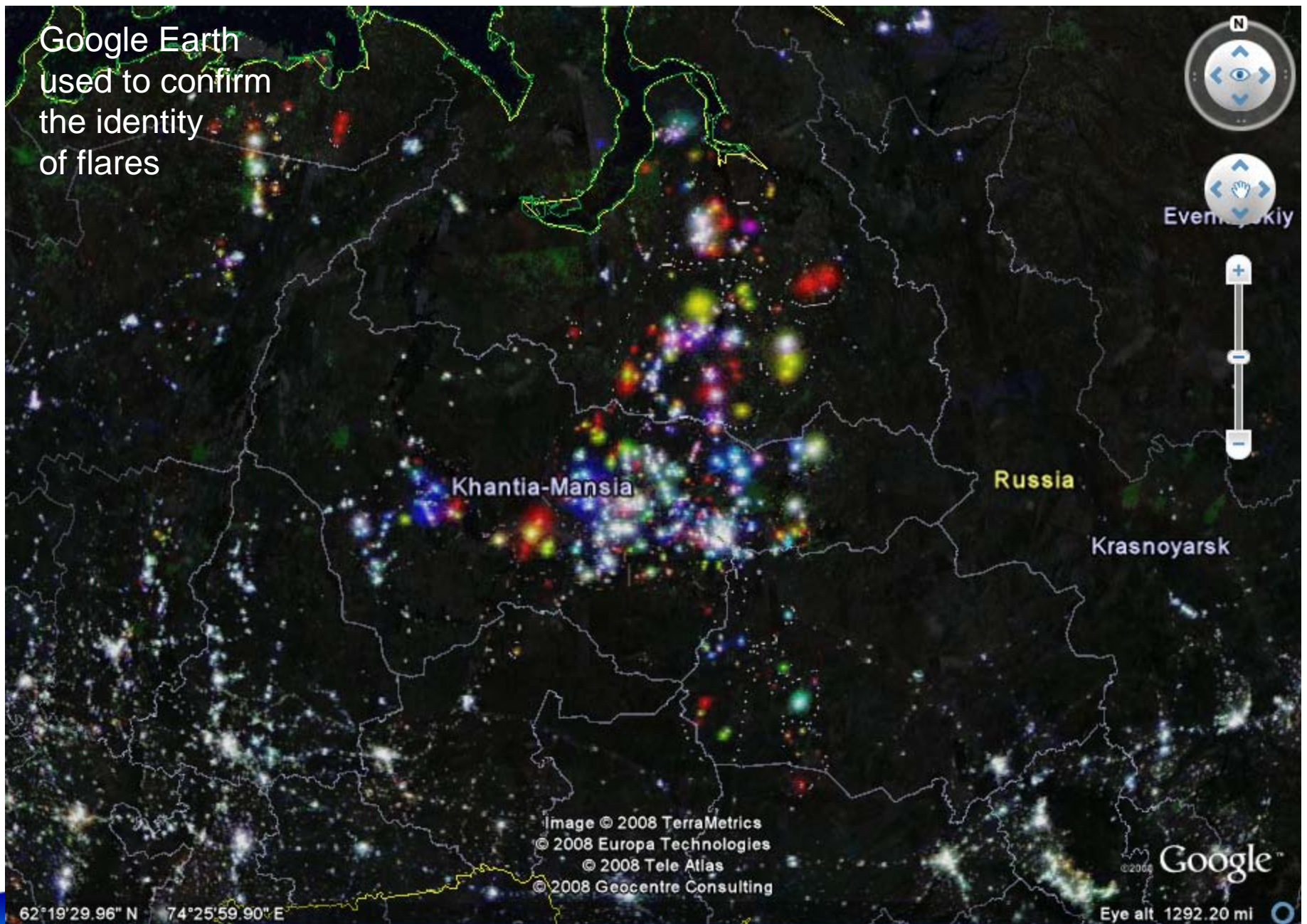
High resolution imagery in Google Earth used to confirm the identity of flares and to remove false detections.



Google Earth
used to confirm
the identity
of flares



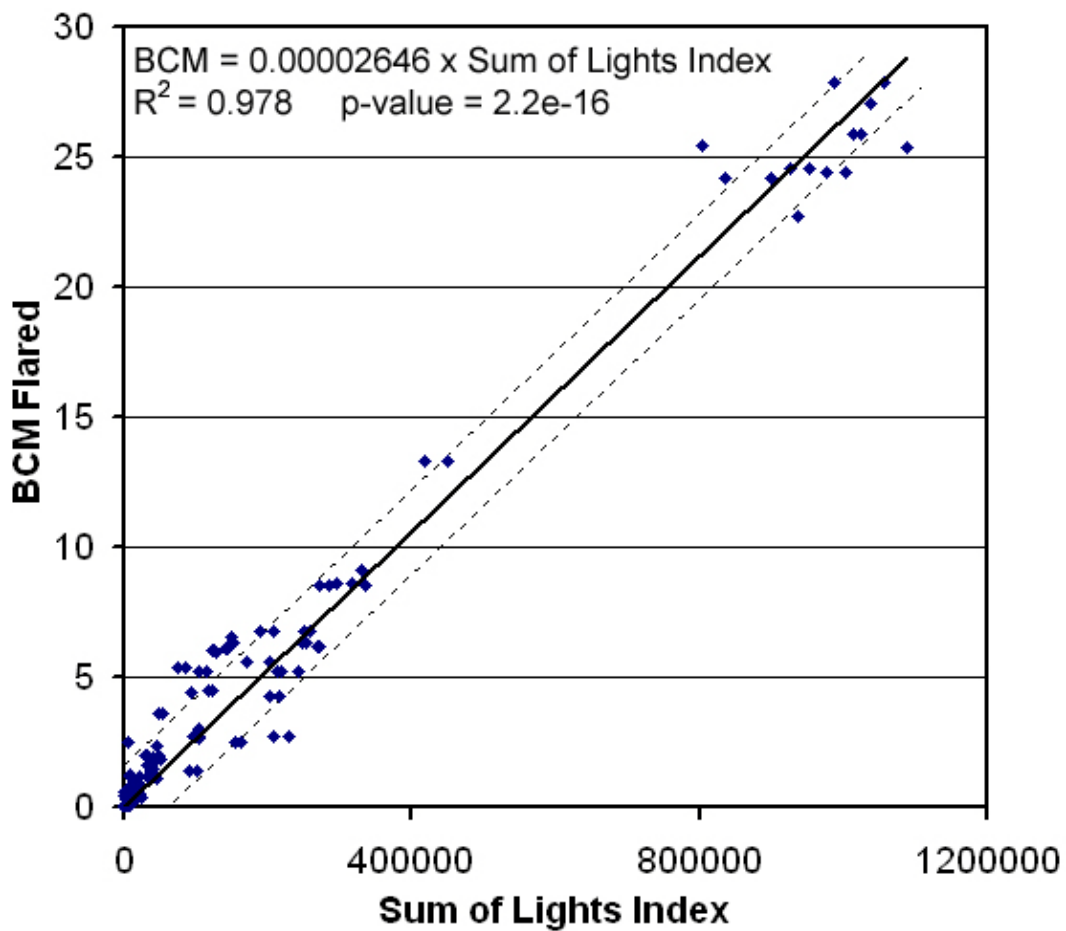
Google Earth
used to confirm
the identity
of flares



62°19'29.96" N 74°25'59.90" E

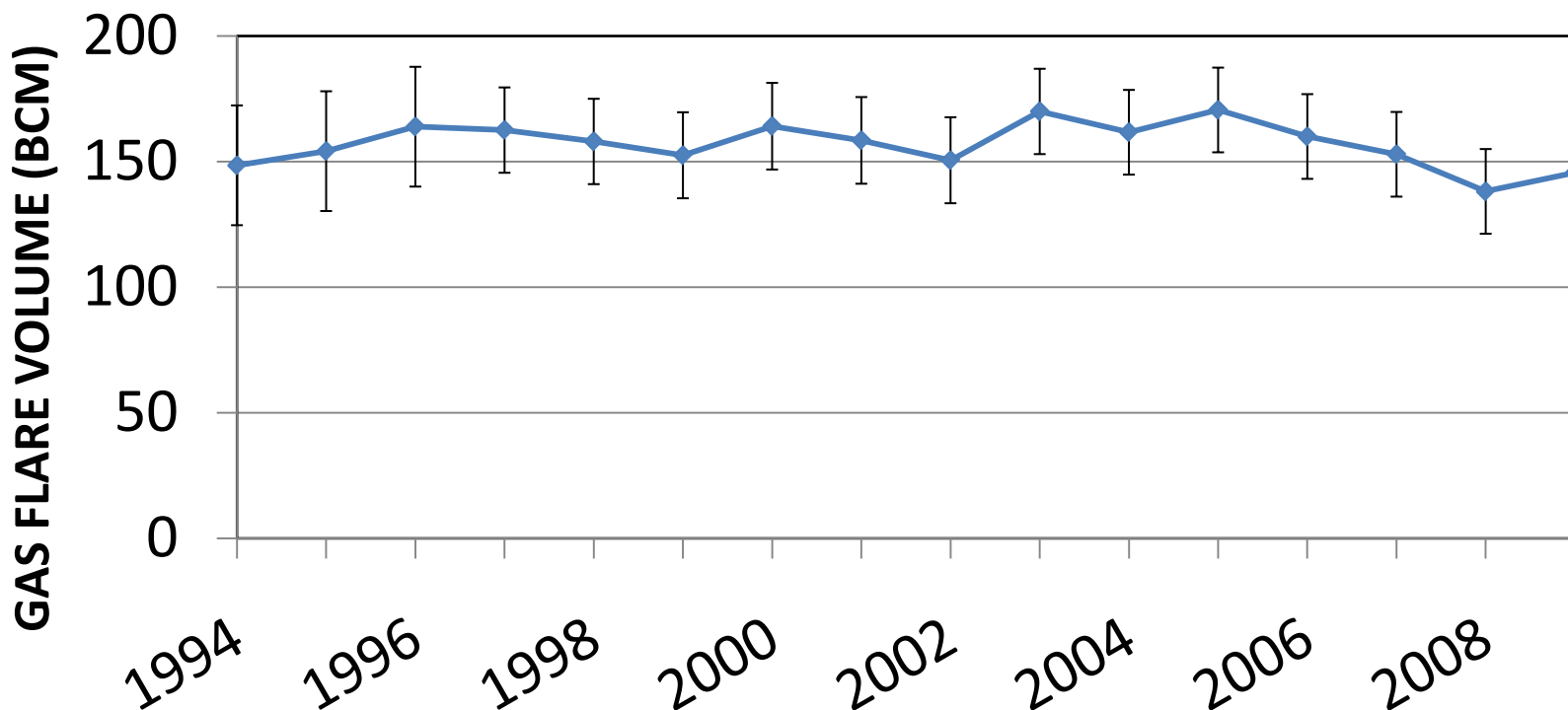
Eye alt 1292.20 mi

Gas Flaring Volume Calibration

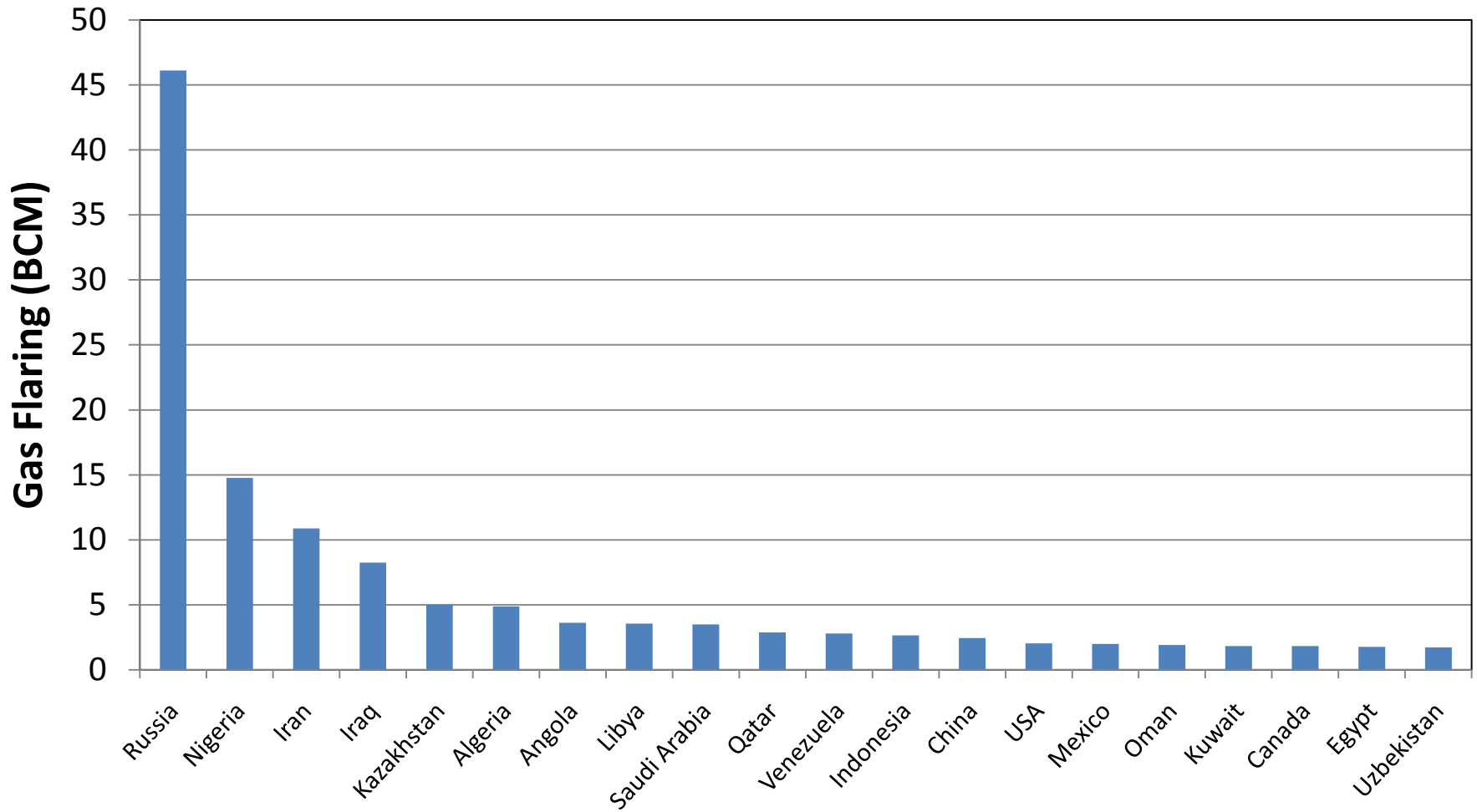


For The Past 16 Years Gas Flaring Has Been Relatively Constant in The 150-170 BCM Range

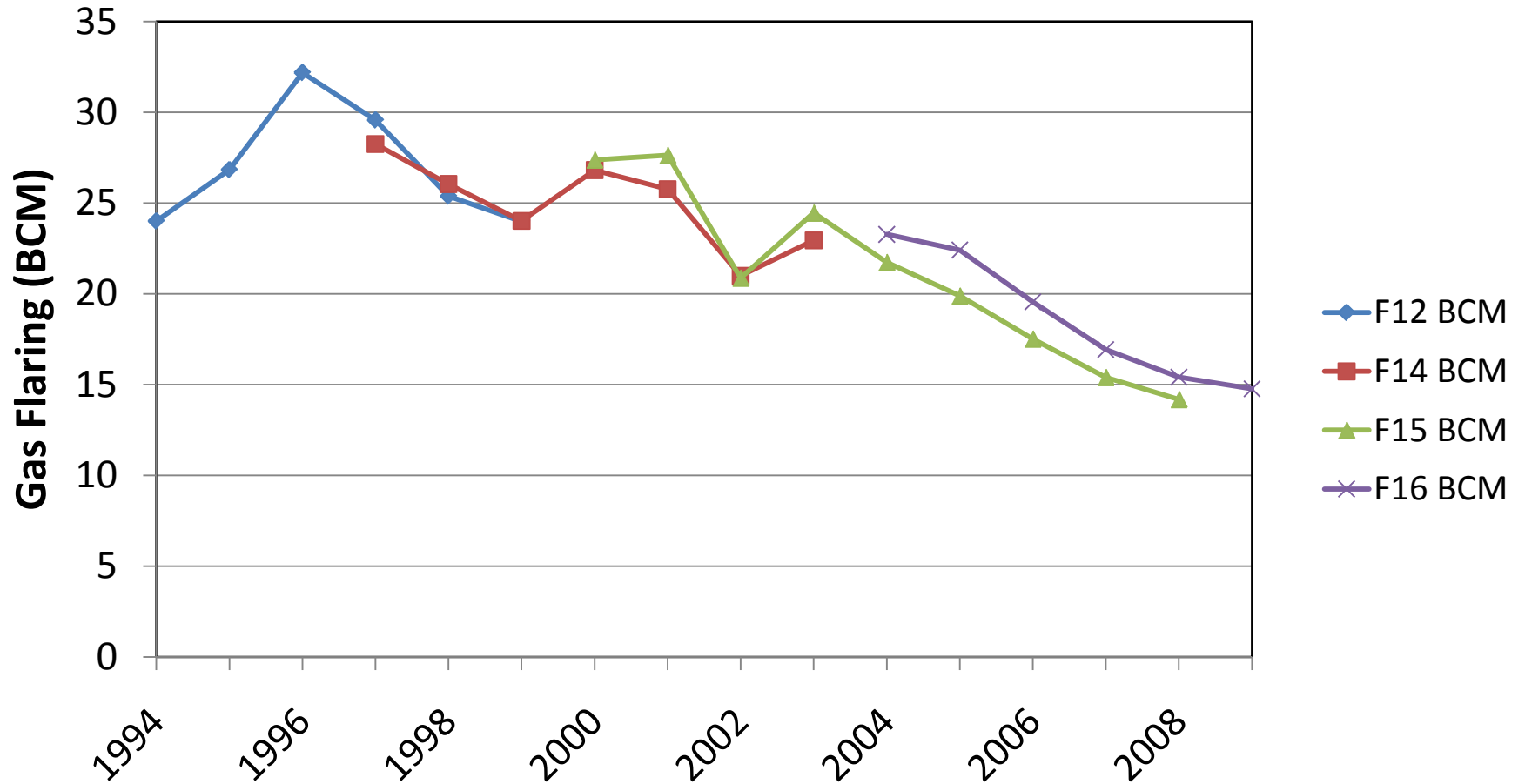
**Global Gas Flaring Volumes Estimated From DMSP Data
In Billions of Cubic Meters**



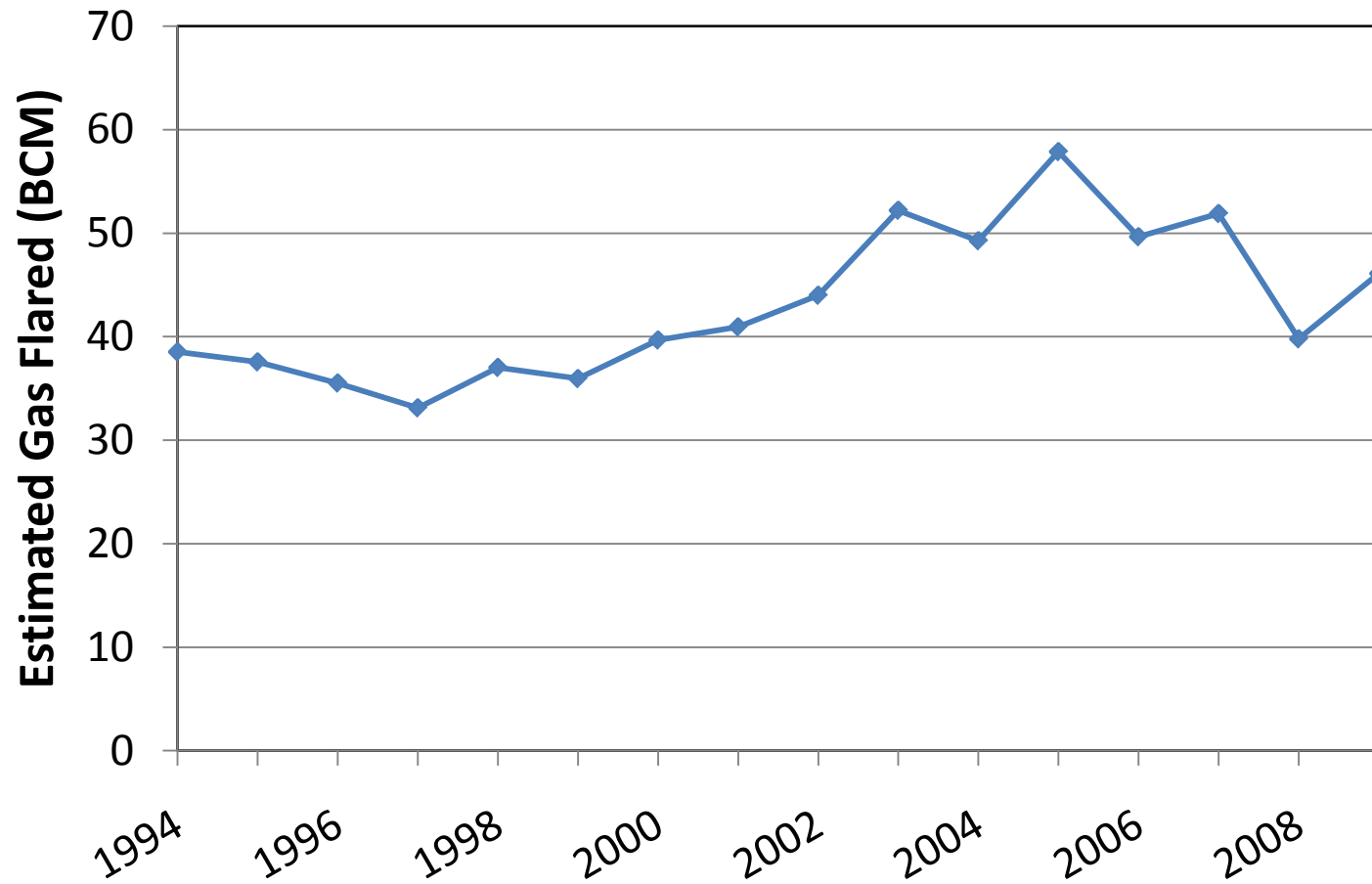
TOP 20 FLARING COUNTRIES 2009



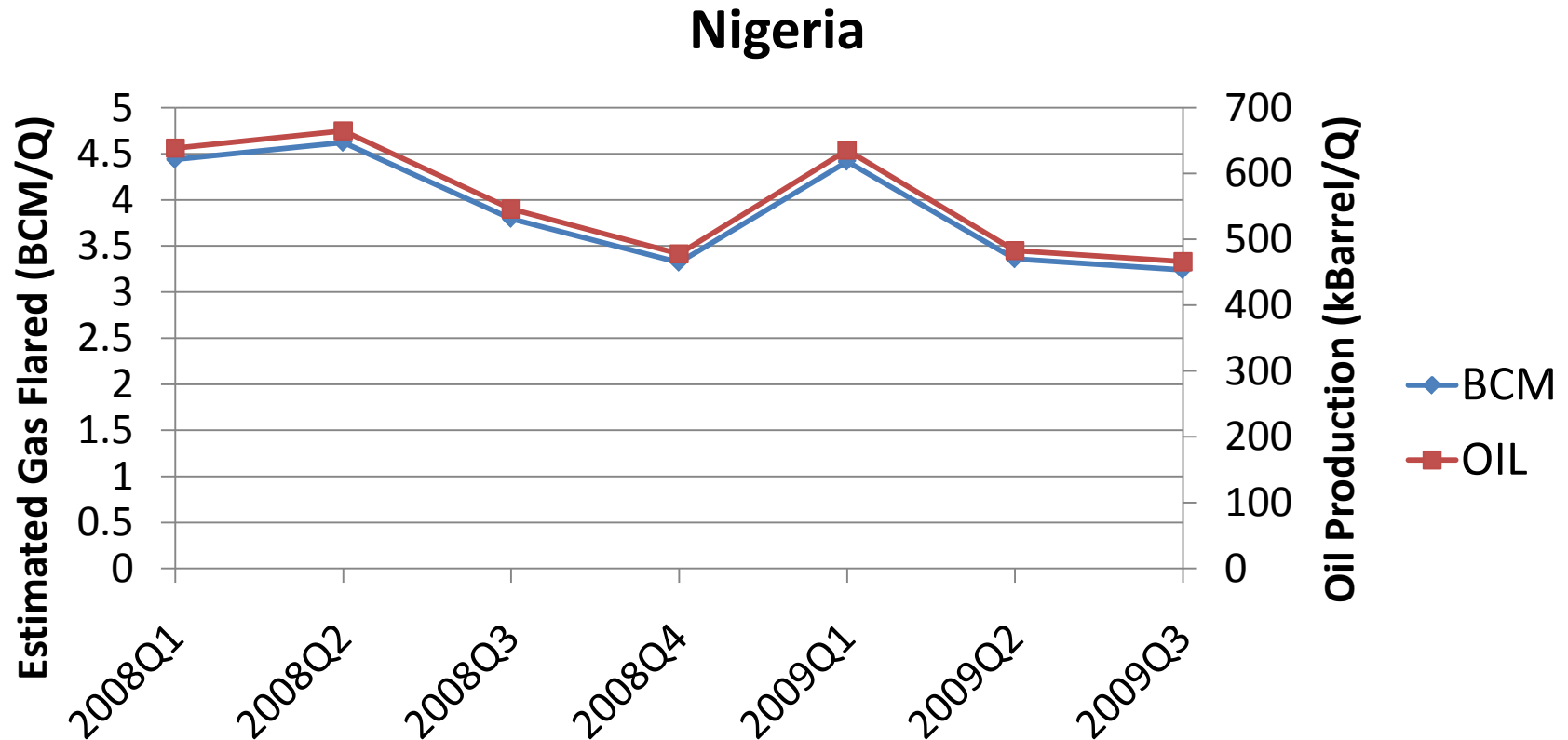
Nigeria



Russia



Did the economic downturn affect gas flaring?



Summary

- The flaring of natural gas has remained largely constant over the past 16 years, in the range of 150 to 170 billion cubic meters per year.
- Gas flaring declined 19% from 2005 to 2008, then went up by 5% in 2009.
- Most of the increase in 2009 came from Russia, which is the leading country in gas flaring.
- It would be possible to make a spatial grid of flare gas emissions covering the 16 year record. Such grids may be useful for atmospheric studies.