Some observations regarding the thermal flux from Earth's erupting volcanoes over the past 13 years

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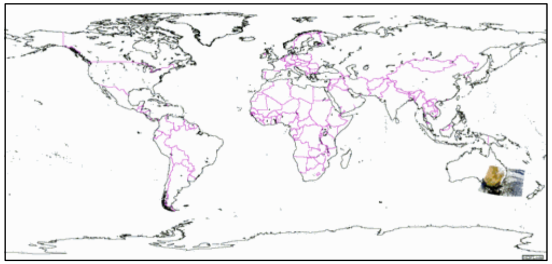
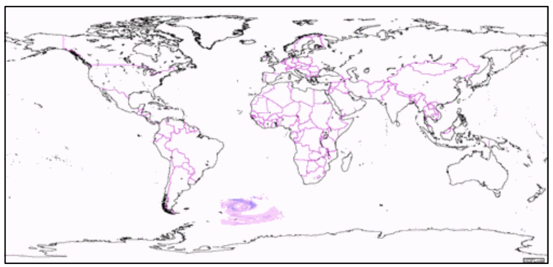
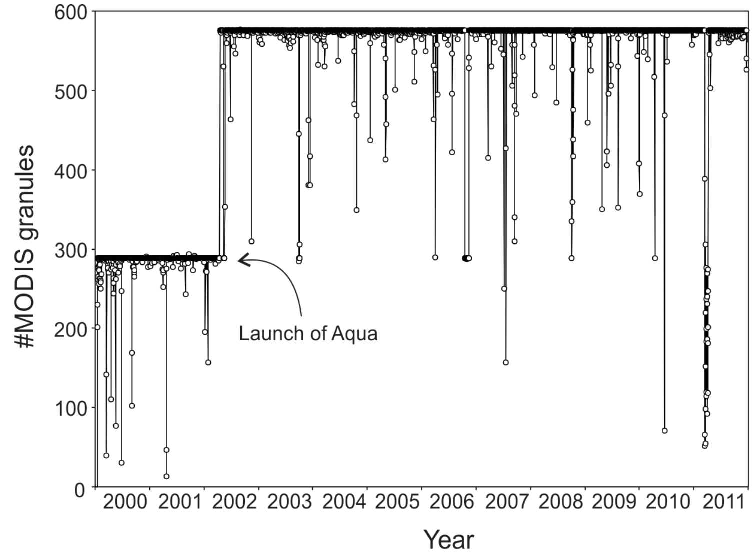
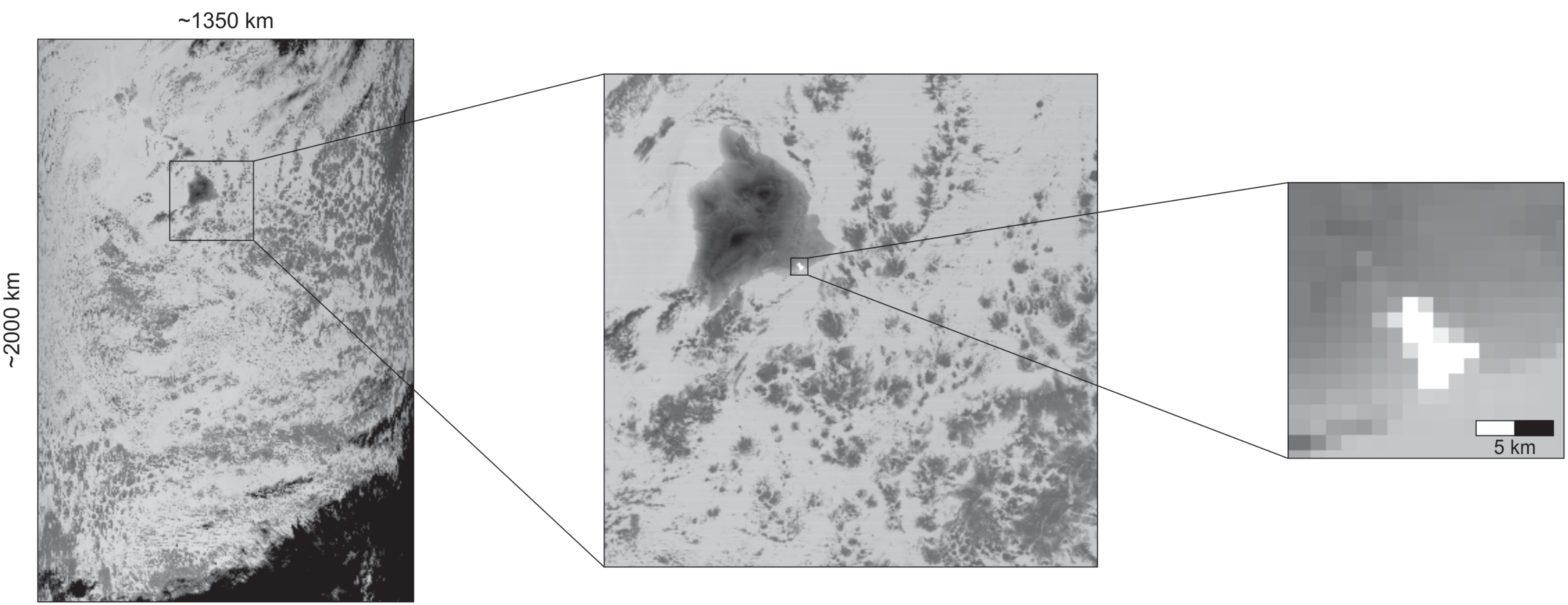
Mānoa

AUTONOMOUS SURVEILLANCE OF EARTH'S VOLCANOES USING MODIS

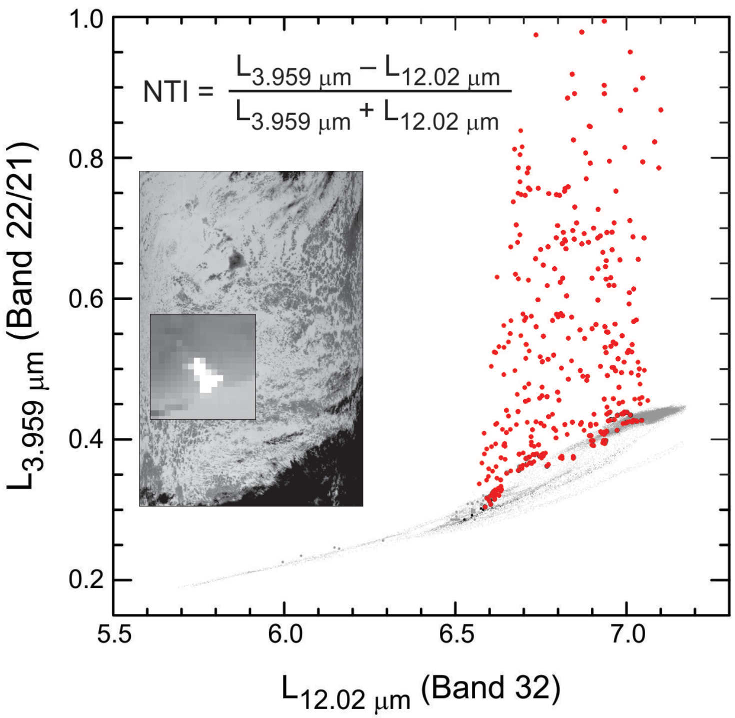


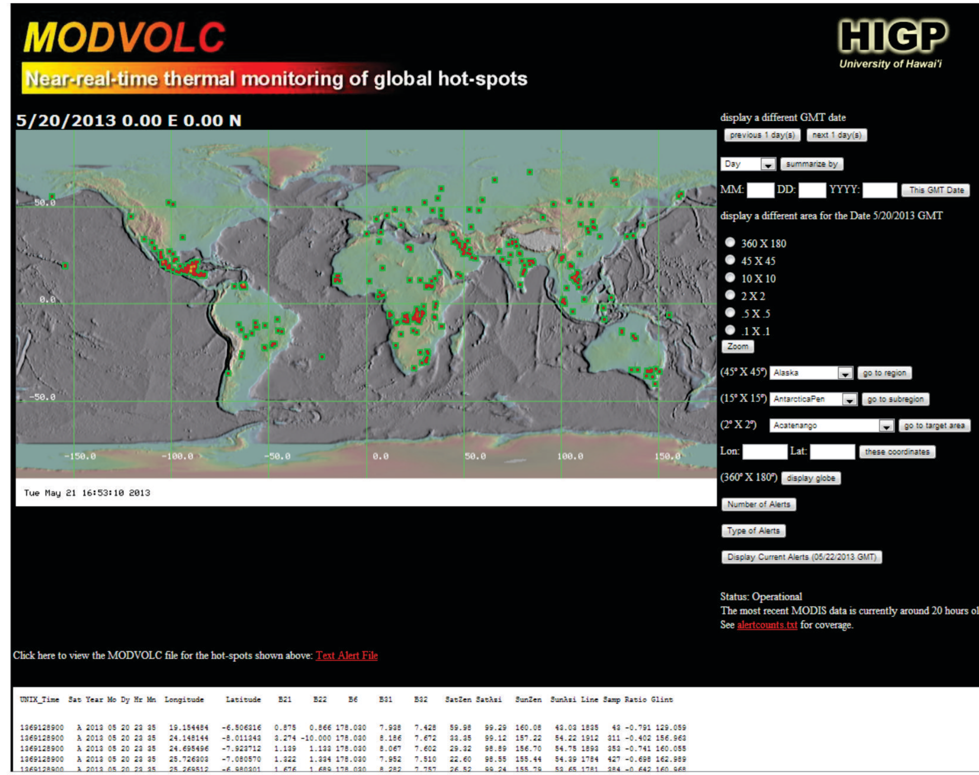






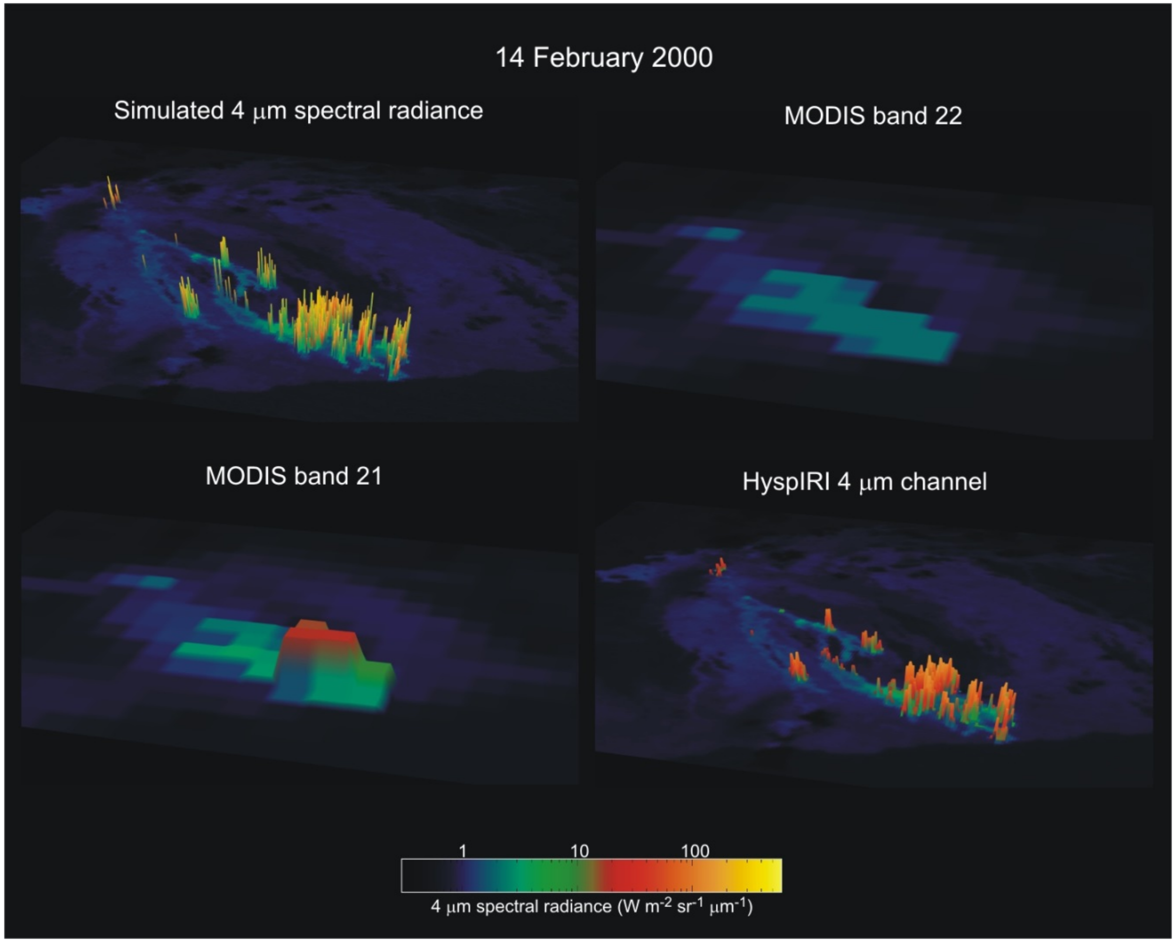
WEB-BASED DELIVERY OF SCIENCE DATA FOR VOLCANO SCIENTISTS

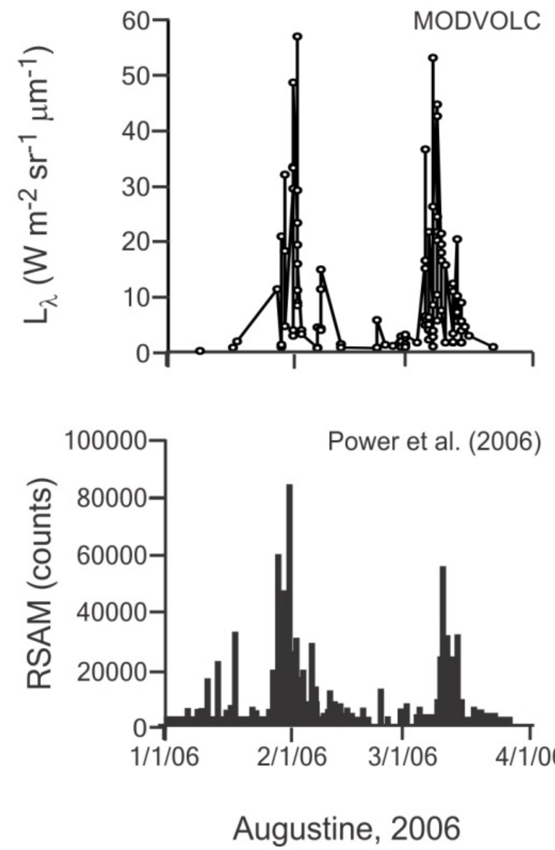




Unix time	Satellite	Year	Month	Day	Hour	Minute	Longitude	Latitude	L_{21}	L_{22}	L_{6}	L_{31}	L_{32}	Satellite zenith	Satellite azimuth	Sun zenith	Sun azimuth	Line	Sample	NTI	Glint vector
									W m^{-2} sr^{-1} μm^{-1}												
1089853500	A	2004	07	14	15	05	159.424927	54.047855	0.775	0.802	177.015	7.087	6.790	42.97	96.49	101.53	22.91	329	210	-0.789	109.602
1089838800	T	2004	07	14	11	00	159.439728	54.049419	2.228	-10.000	166.546	8.392	7.967	5.88	75.11	98.09	325.58	793	743	-0.563	95.933
1089853500	A	2004	07	14	15	05	159.448288	54.052444	1.440	1.453	177.015	7.786	7.453	42.97	97.57	101.53	22.93	331	211	-0.674	108.869
1089853500	A	2004	07	14	15	05	159.453903	54.045853	1.218	1.235	177.015	7.558	7.156	42.97	96.49	101.53	22.93	329	211	-0.706	109.617

QUANTIFYING THERMAL FLUXES FROM ACTIVE VOLCANOES

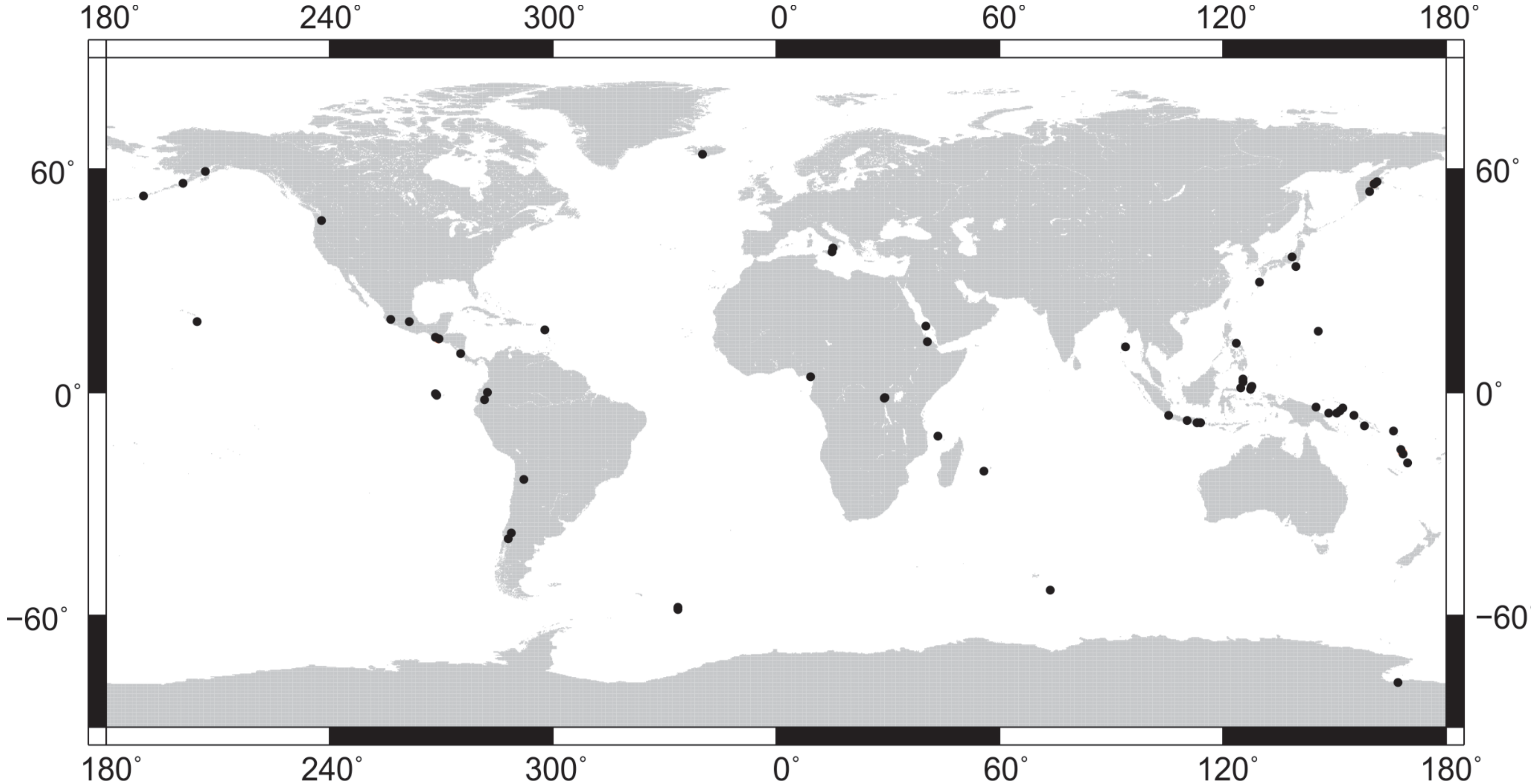




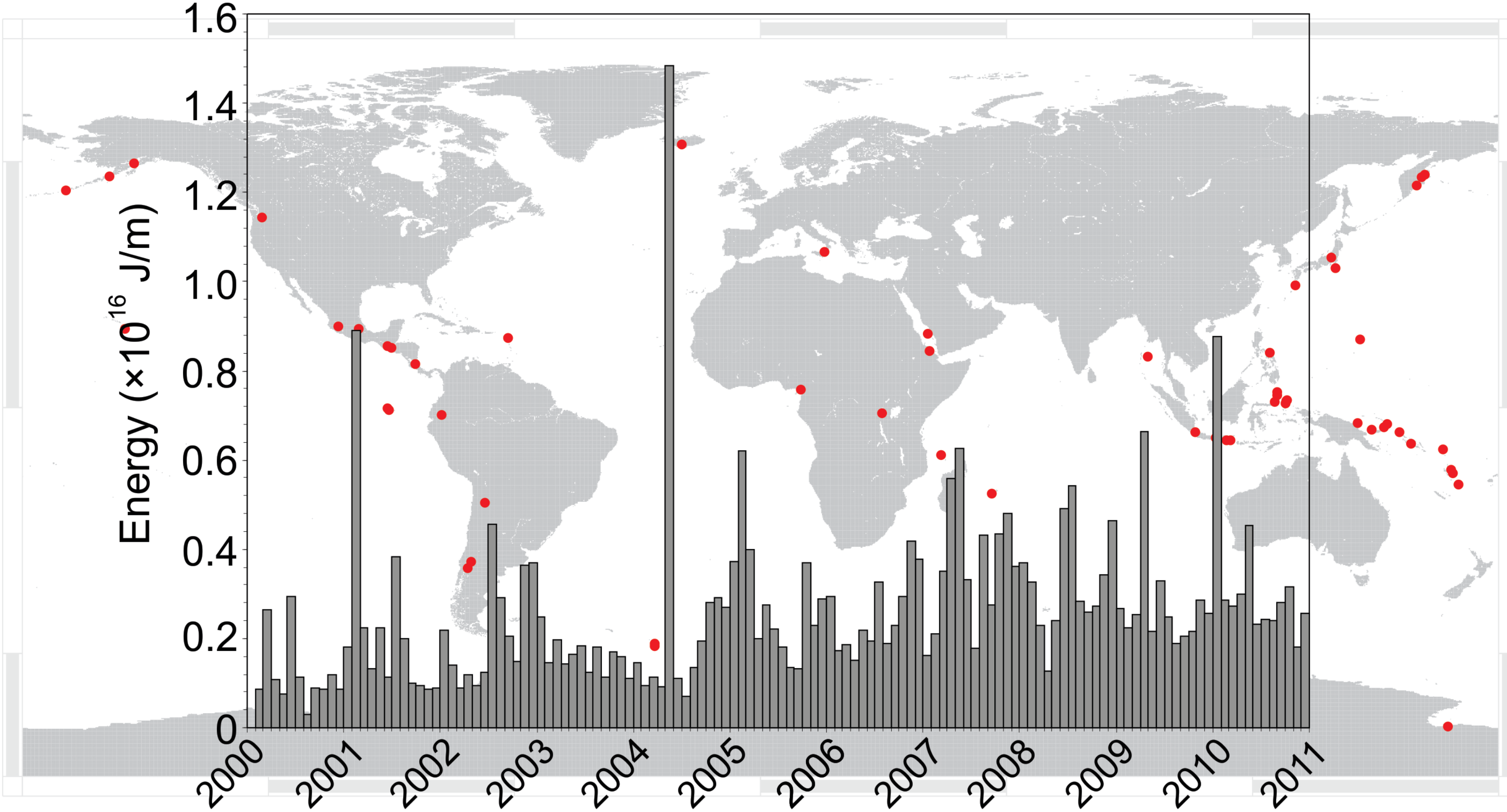
Φ (J/s) = $1.89 \times 10^{7}(L_{MIR} - L_{MIR,\ bg})$, after Wooster et al. (2003)

Results

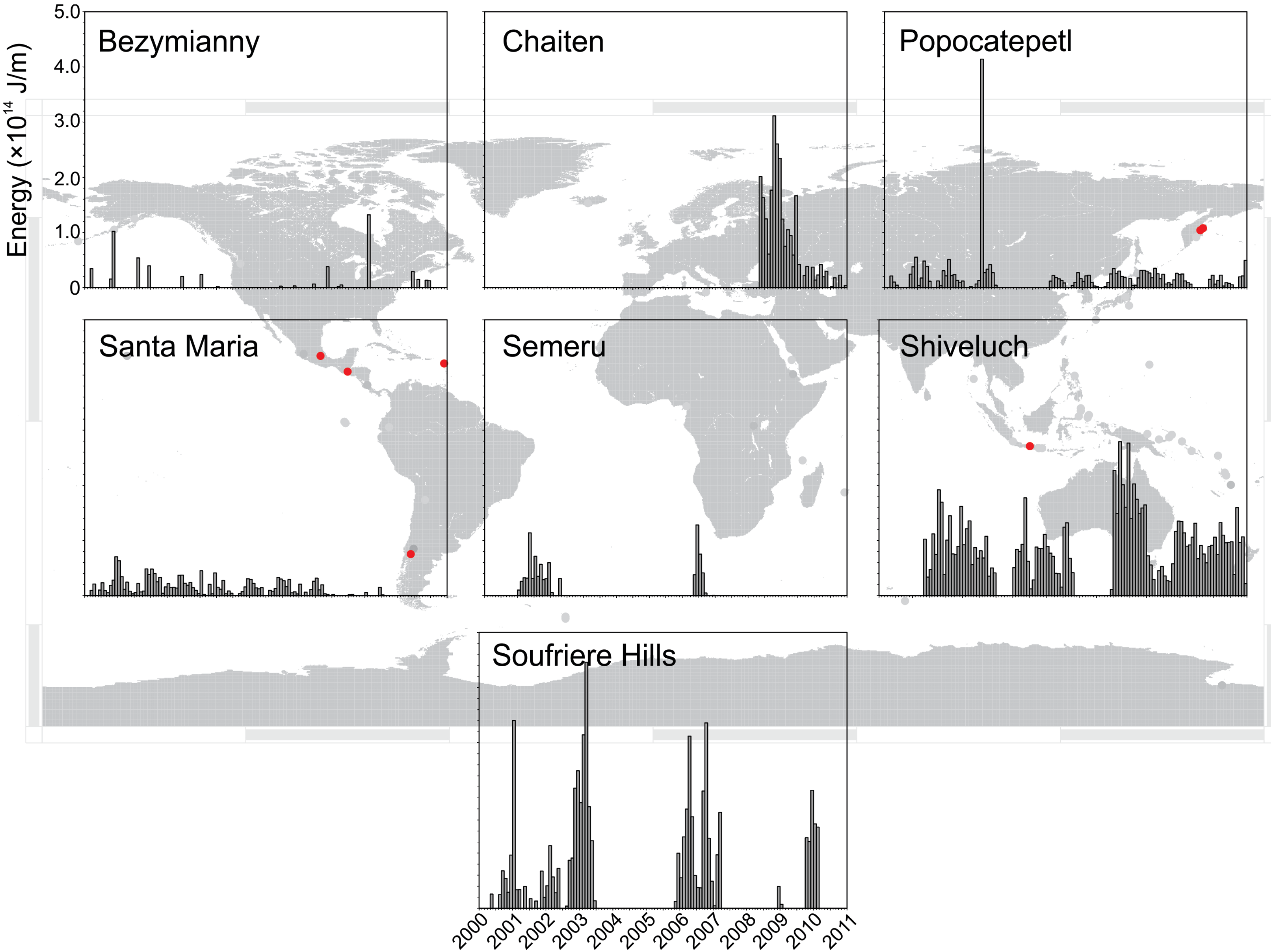
Quantification of the thermal emission from 92 volcanoes over 11 years, via analysis of 2.3 million MODIS images



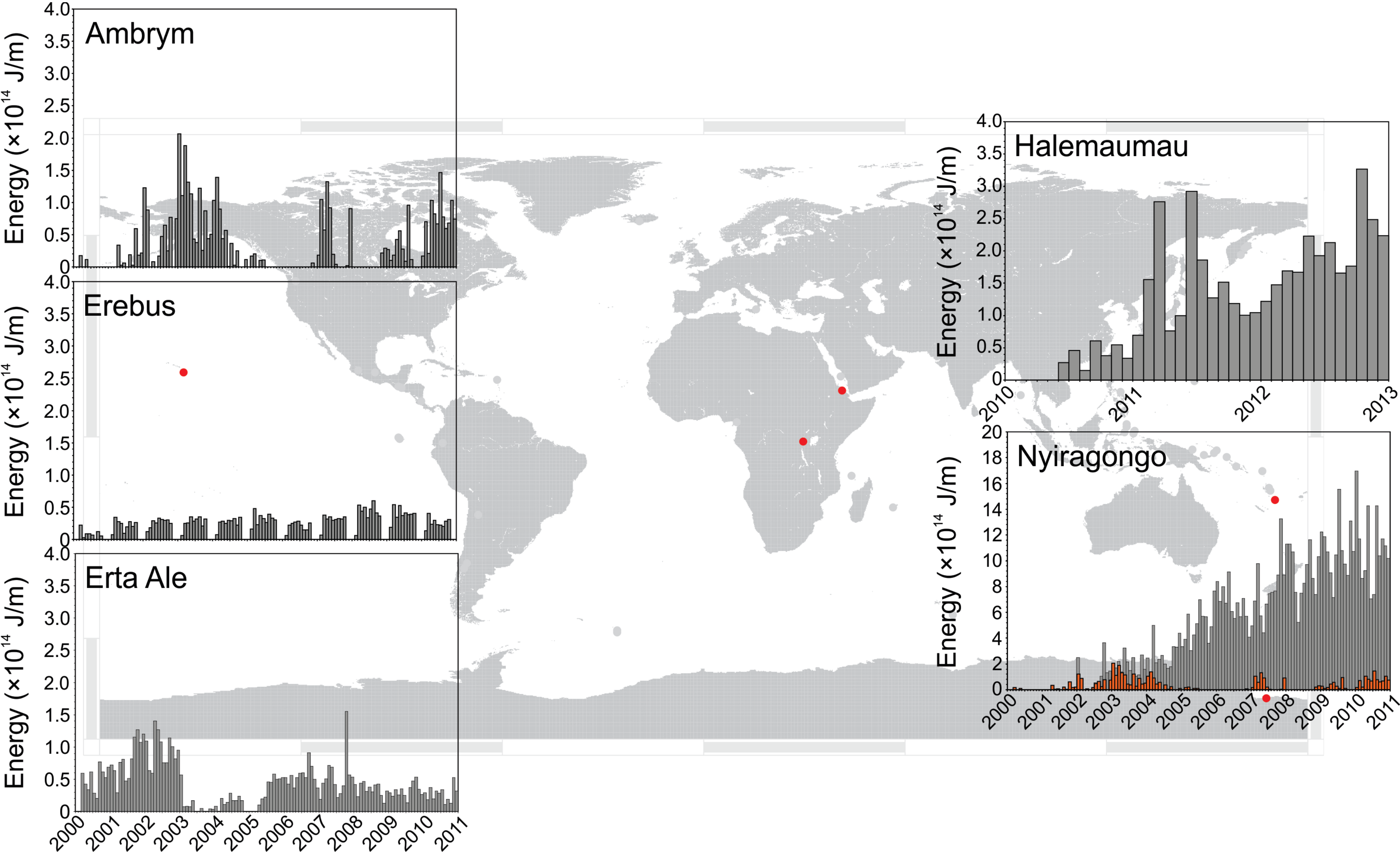
INTENSE OUTPOURINGS OF ENERGY SUPERIMPOSED ON A SUBTLE DECADAL SCALE ESCALATION IN THERMAL EMISSION



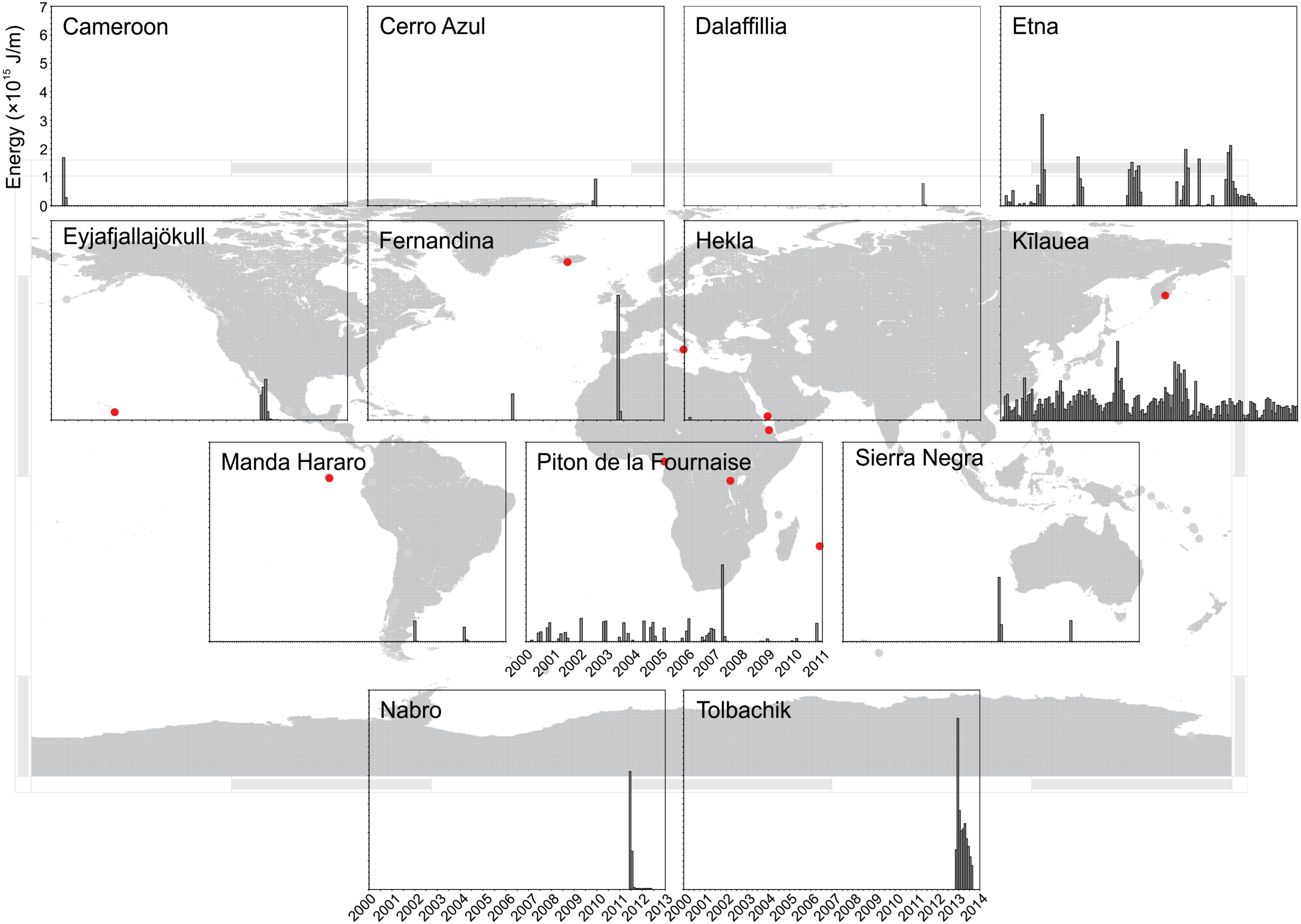
THE THERMAL CHARACTERISTICS OF ACTIVE LAVA DOMES



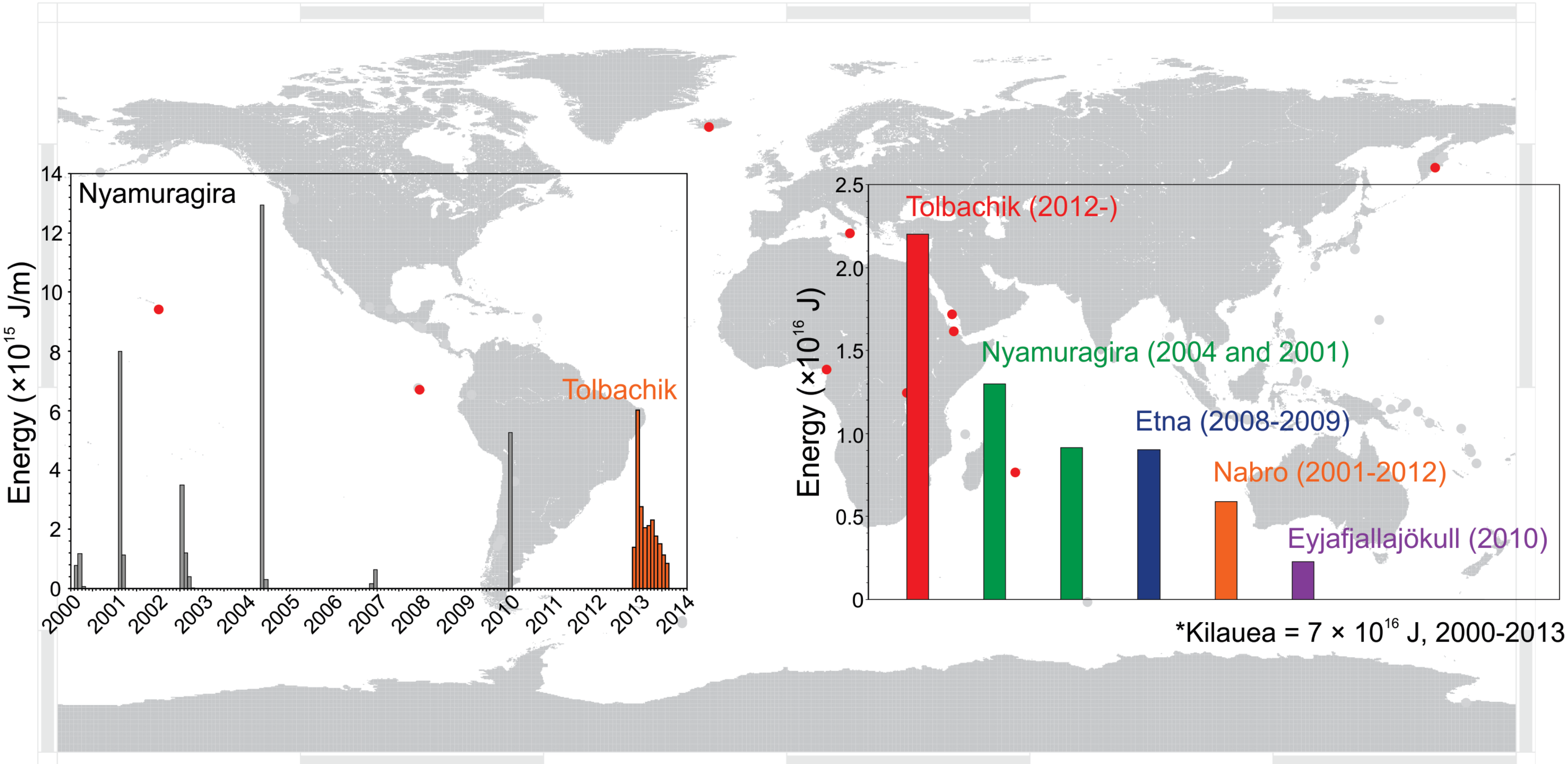
THE THERMAL CHARACTERISTICS OF ACTIVE LAVA LAKES



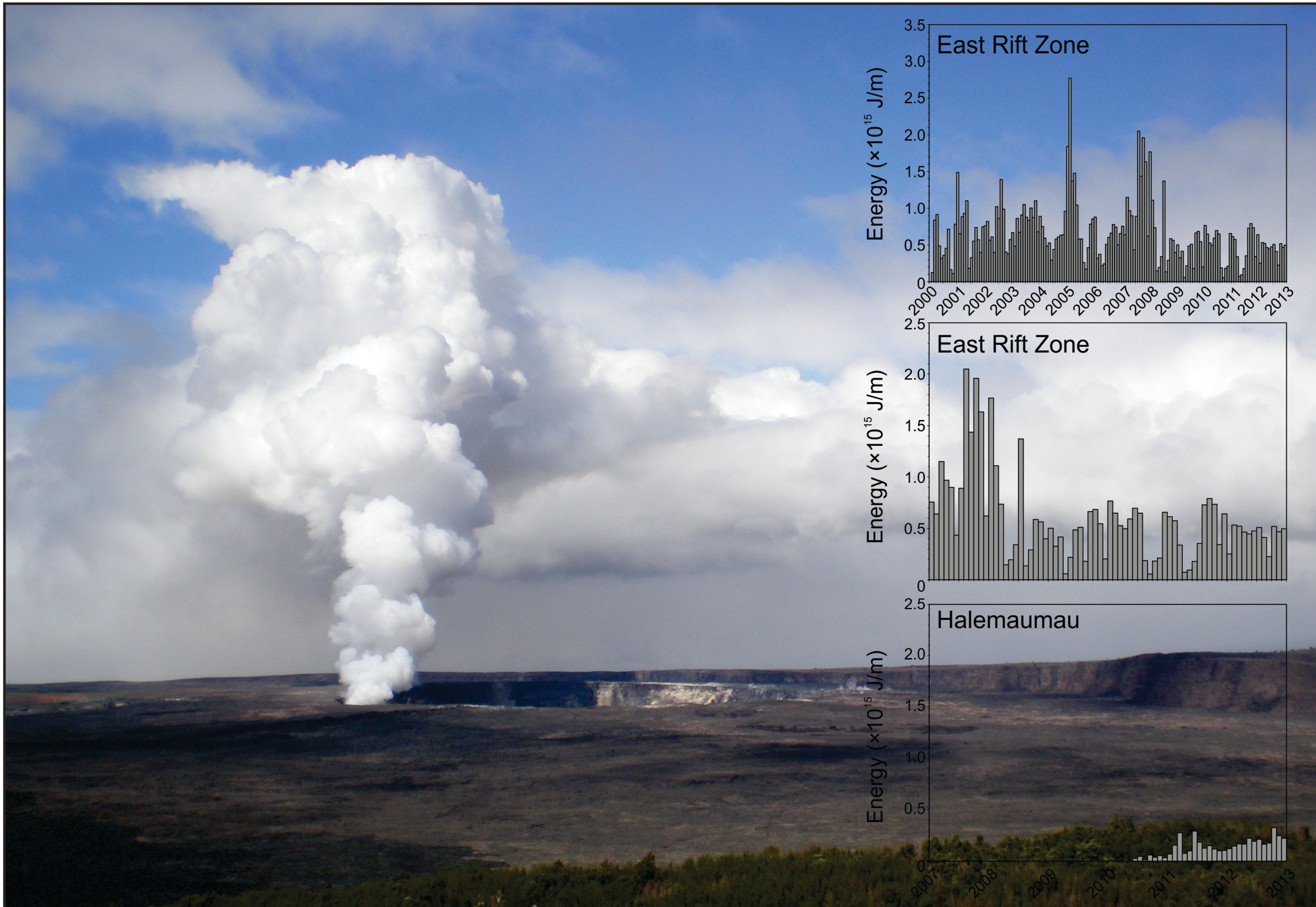
THE THERMAL CHARACTERISTICS OF ACTIVE LAVA FLOWS



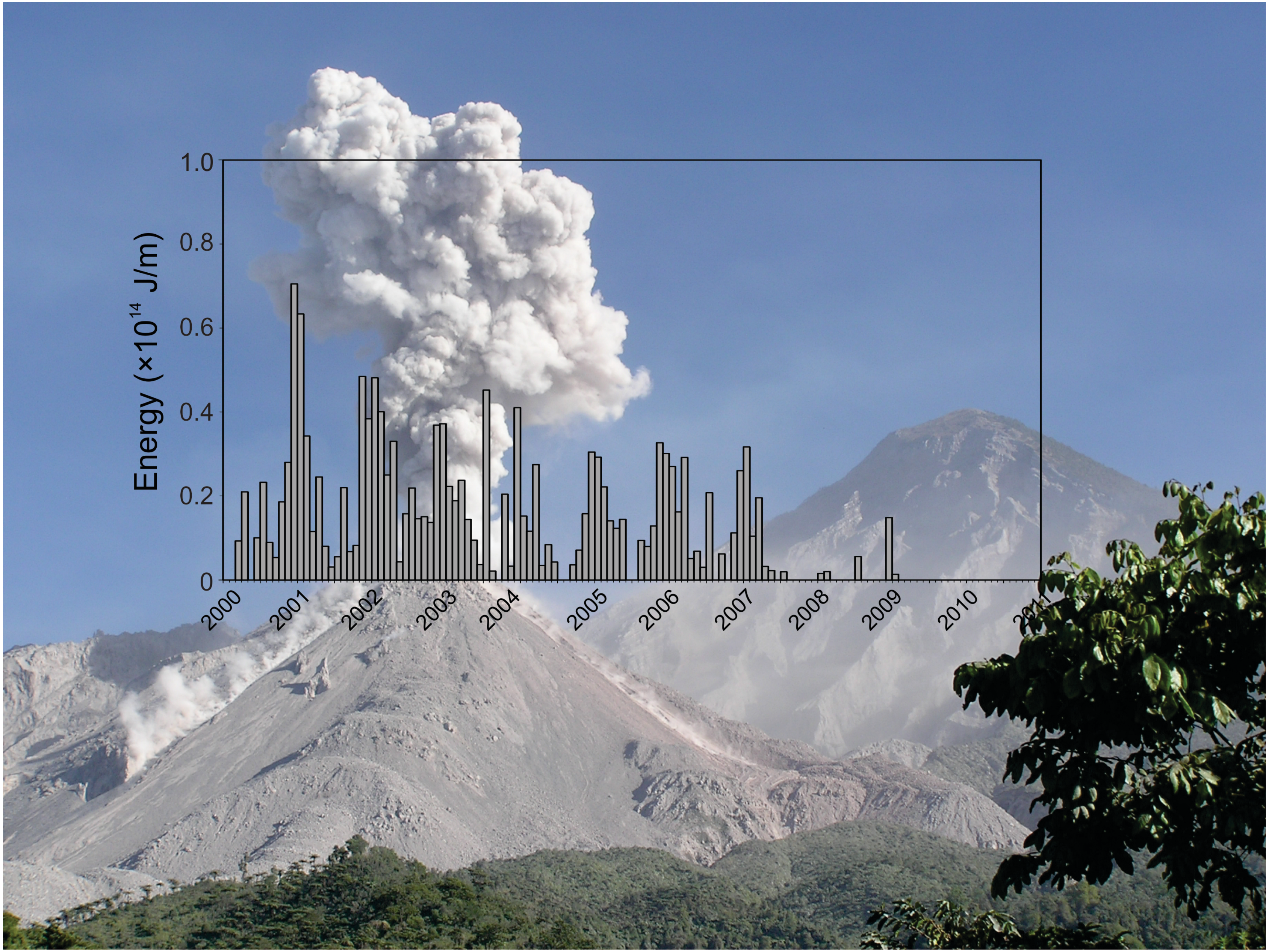
QUANTIFYING THE INTENSITY AND MAGNITUDE OF EARTH'S VOLCANIC ERUPTIONS



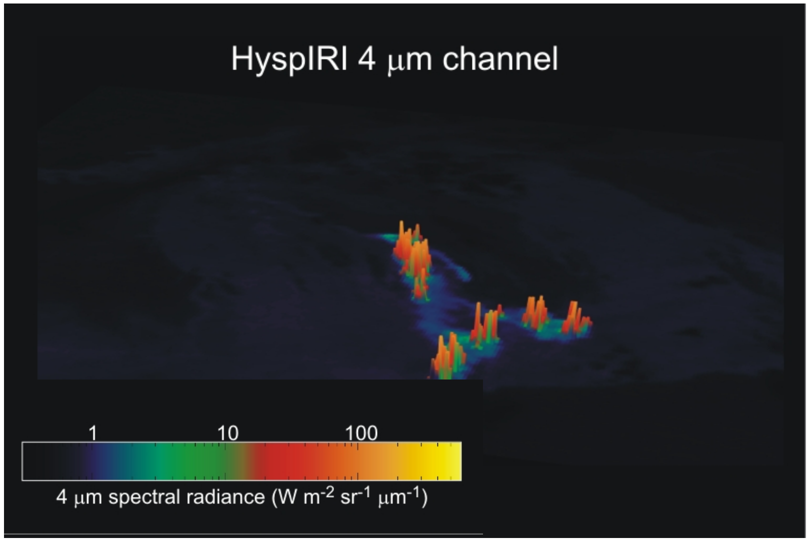
Establishment of a lava lake at the summit of Kilauea

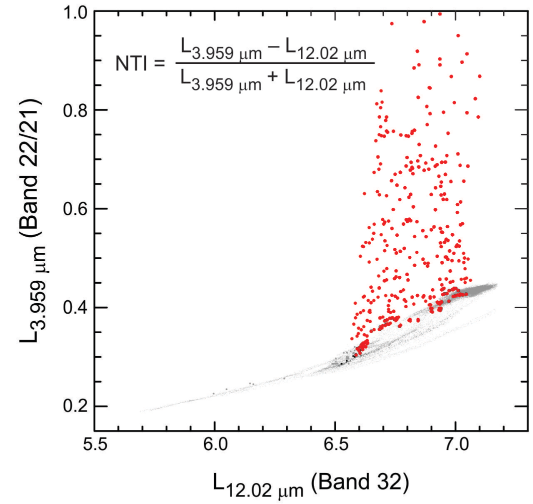


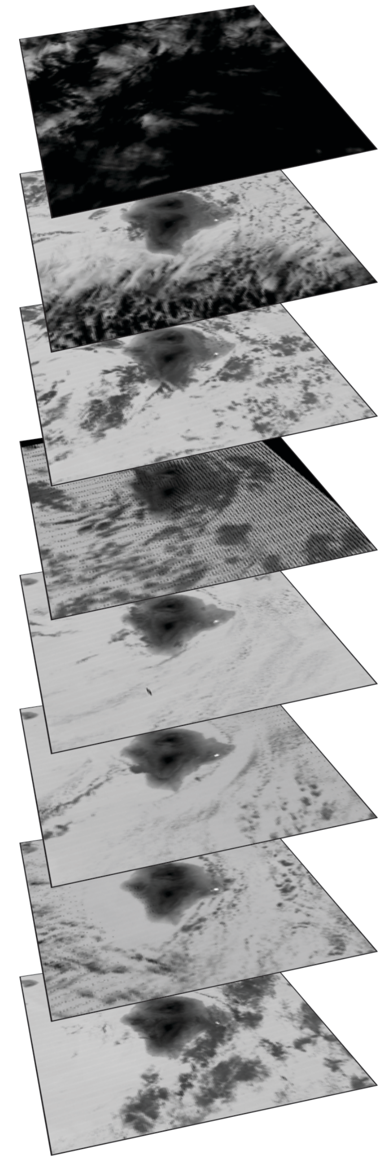
The end of another cycle of dome forming lava effusion at Santa Maria?

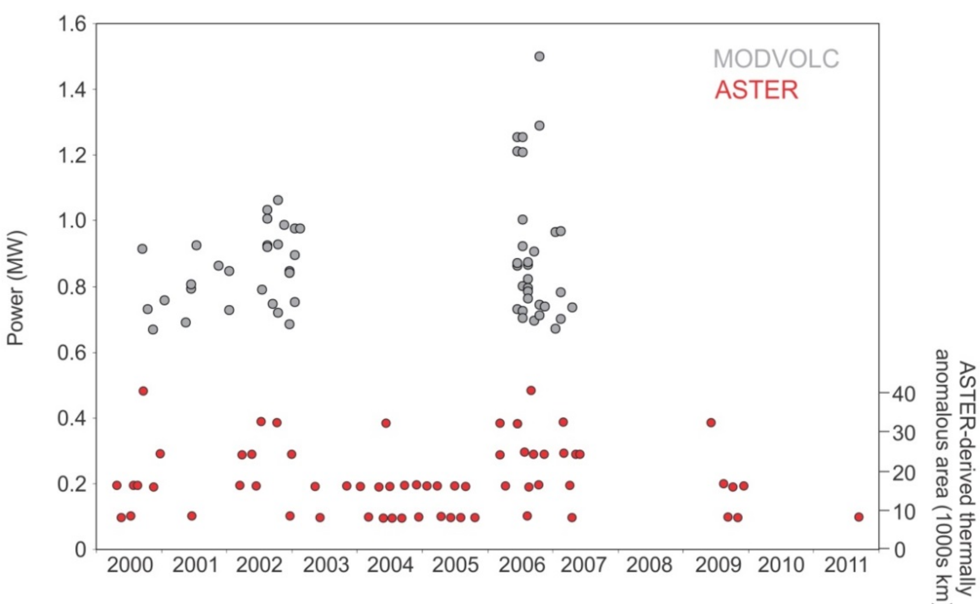


Quantifying thermal unrest at Earth's volcanoes with HyspIRI, and the impact of re-scoping as a free-flying TIR mission

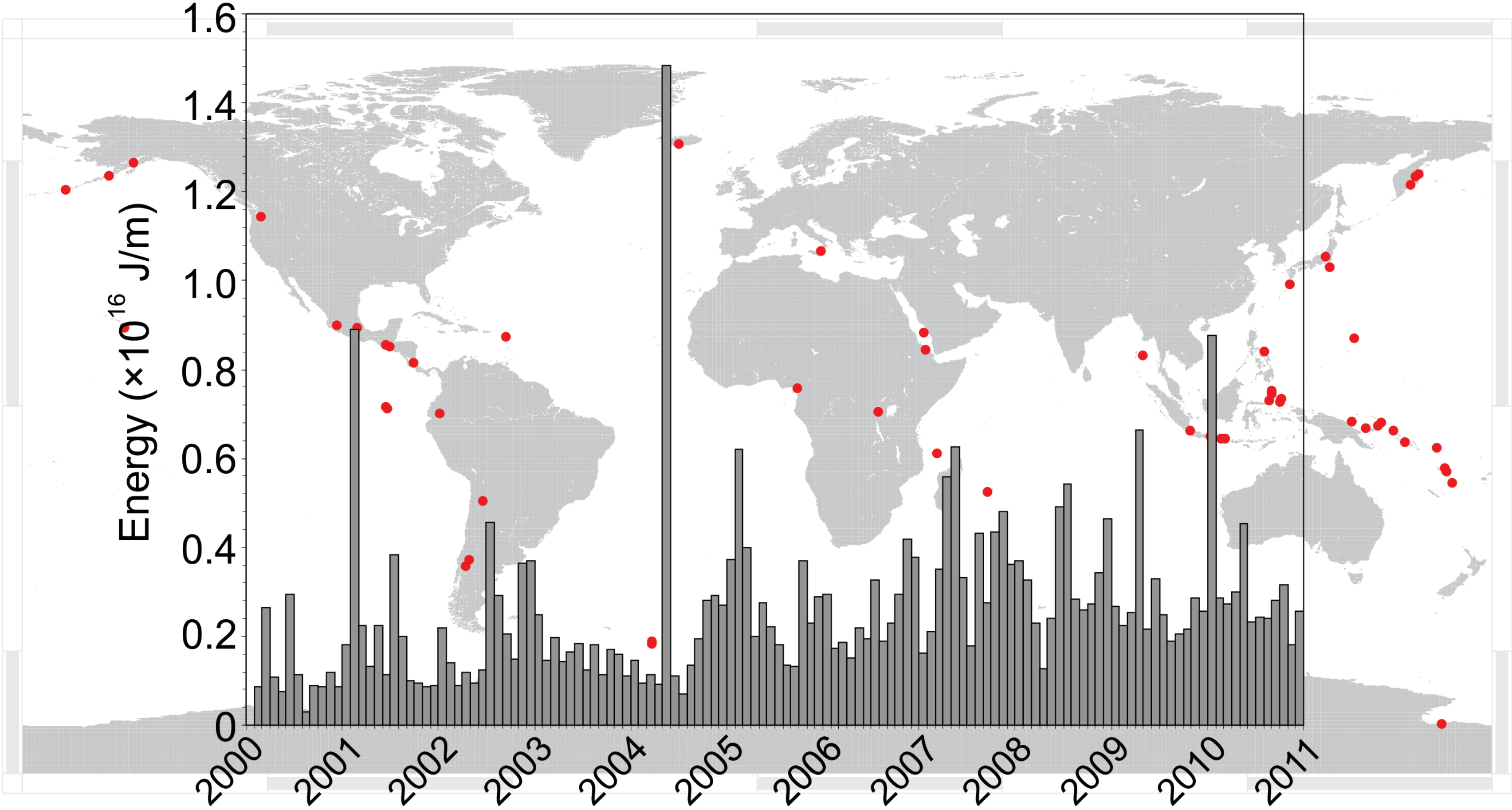








QUESTIONS?



Energy (×10^16 J/m)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011