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VIIRS-based MTG FCI pixel size simulations

- fire detection (30 April / 01 May 2019)

EUMETSAT, MTG FCI MAG, Darmstadt, 12-13 June 2019

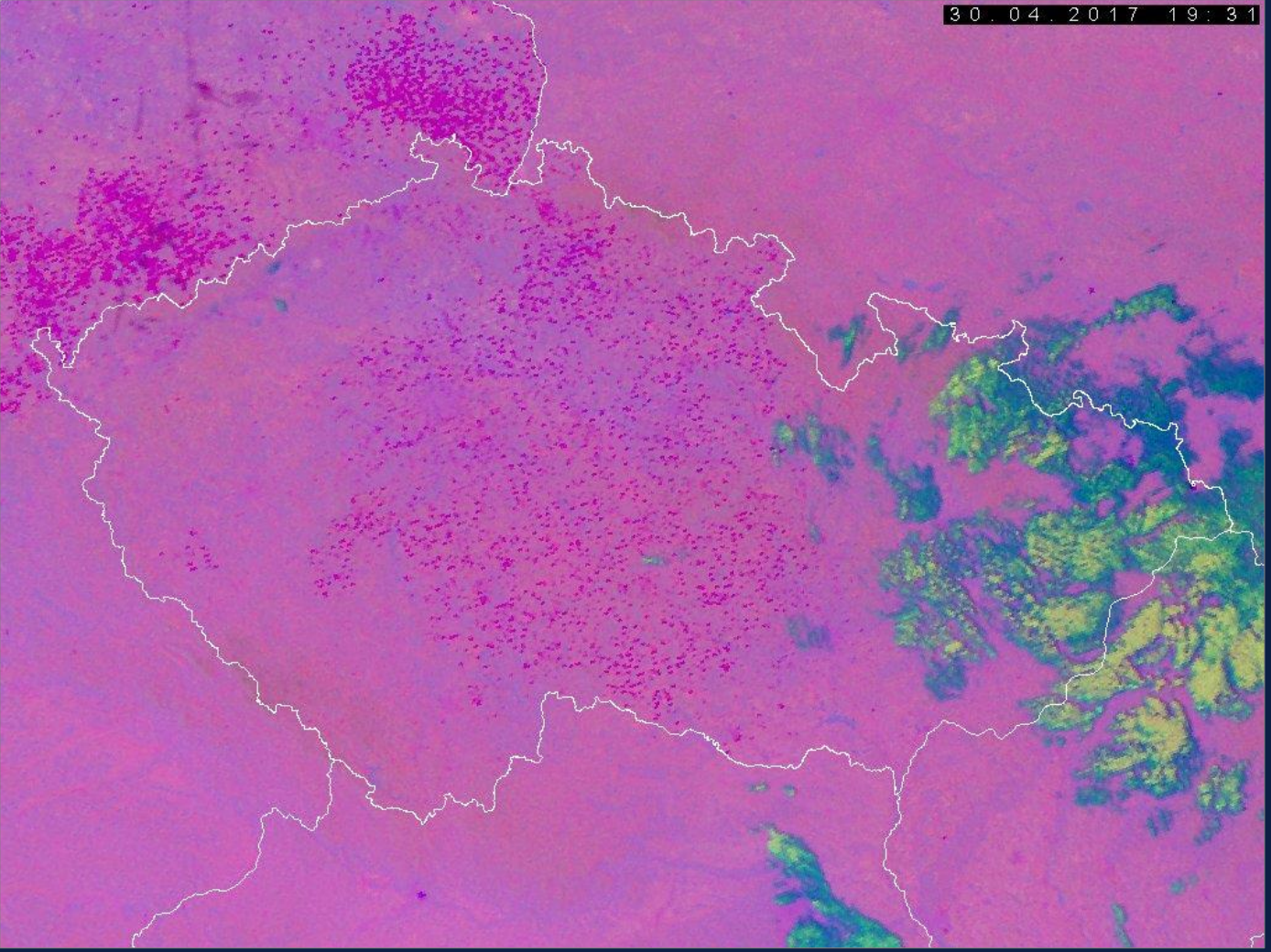
30 April / 01 May 2019 – FIRE DETECTION

Beltain (Beltane) night, or Walpurgis night

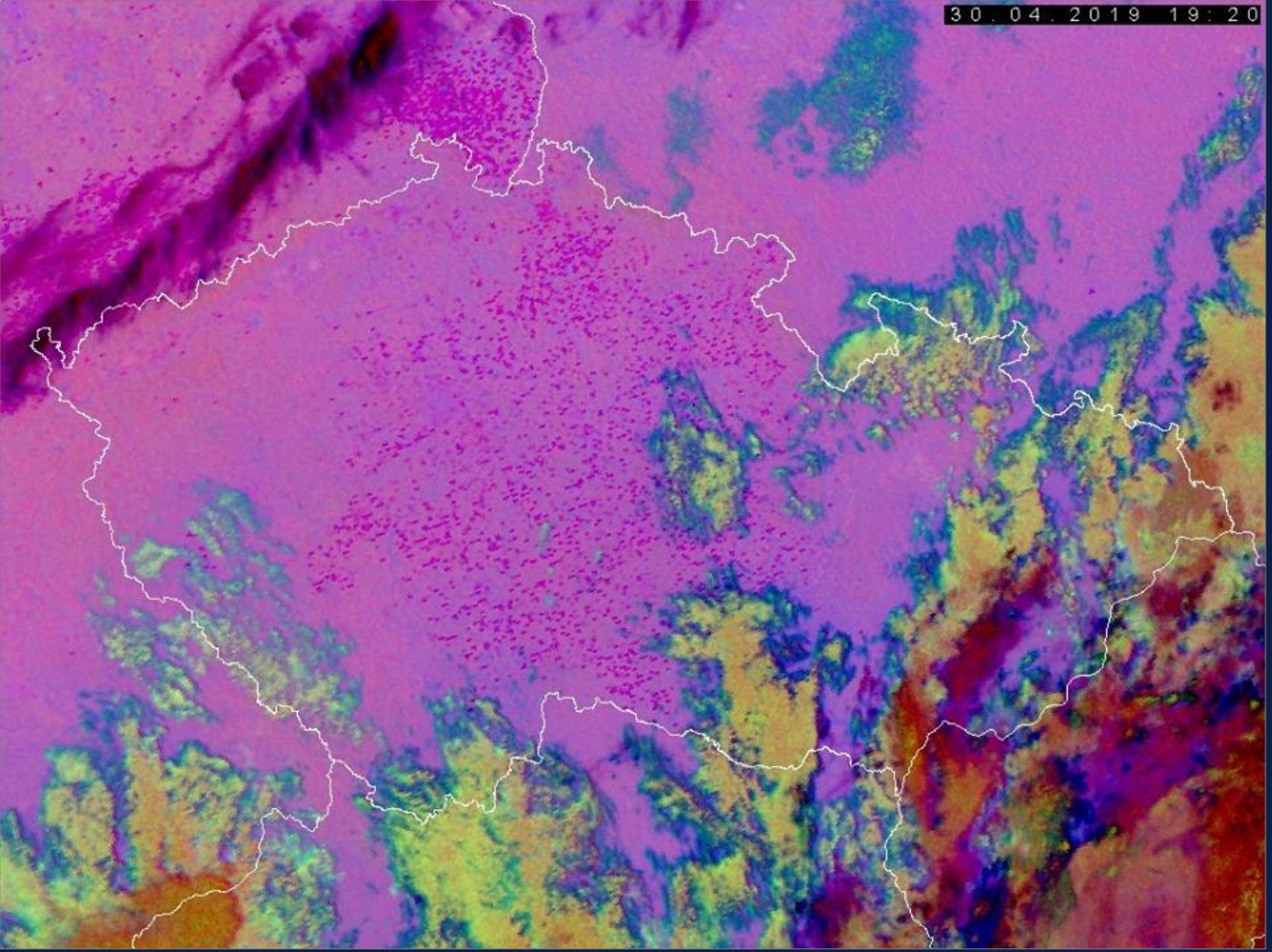
Source data: NOAA-20 (JPSS-1), VIIRS bands I4 3.74 and I5 11.45 μm (375m, SDR), 01:20 UTC

processed in ENVI, using its bilinear interpolation and pixel aggregate resampling methods

simulations of MTG FCI IR 3.8 (3.80 μm) and IR10.5 (10.50 μm) 1 km HR / 2 km NR bands

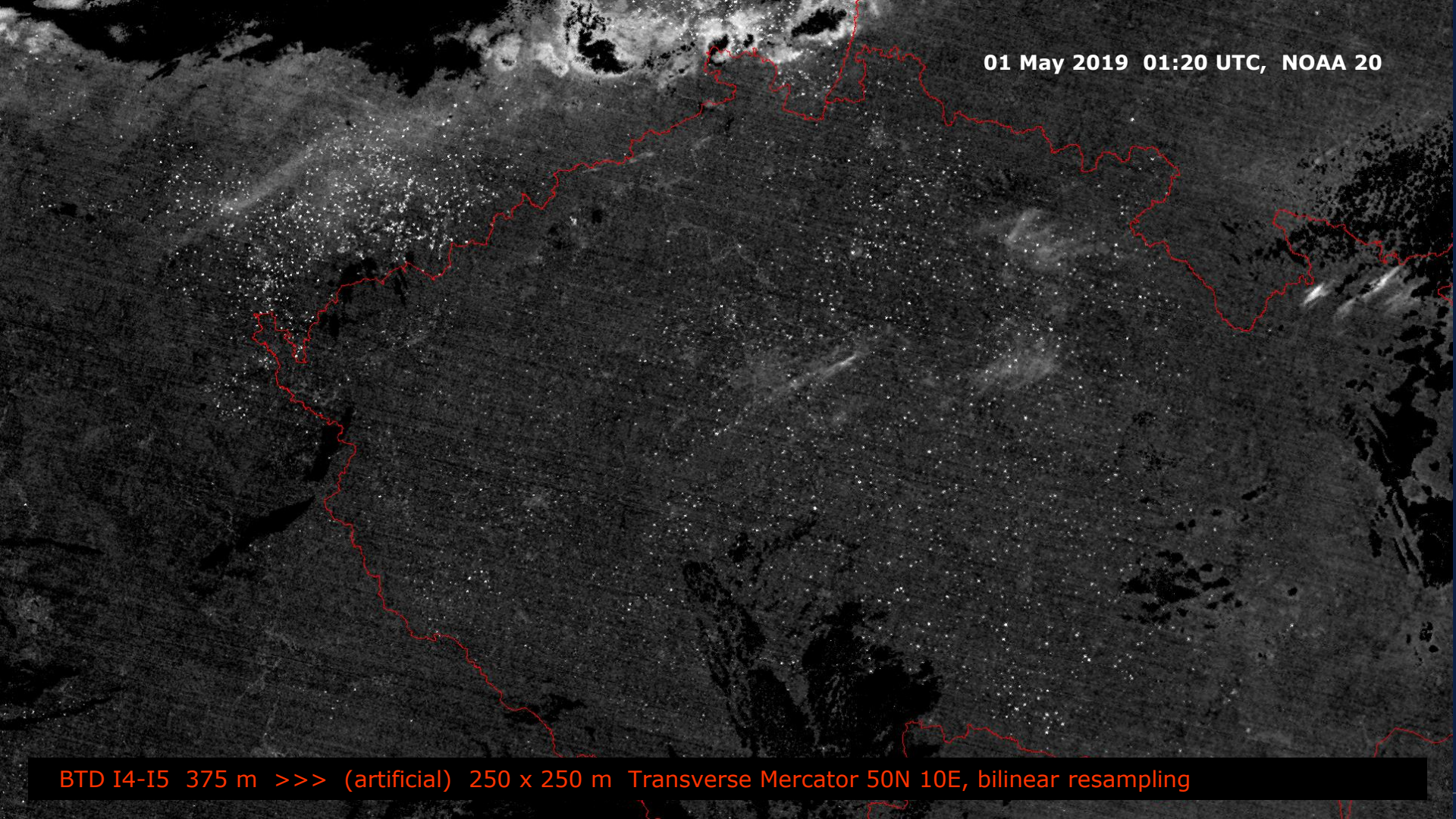


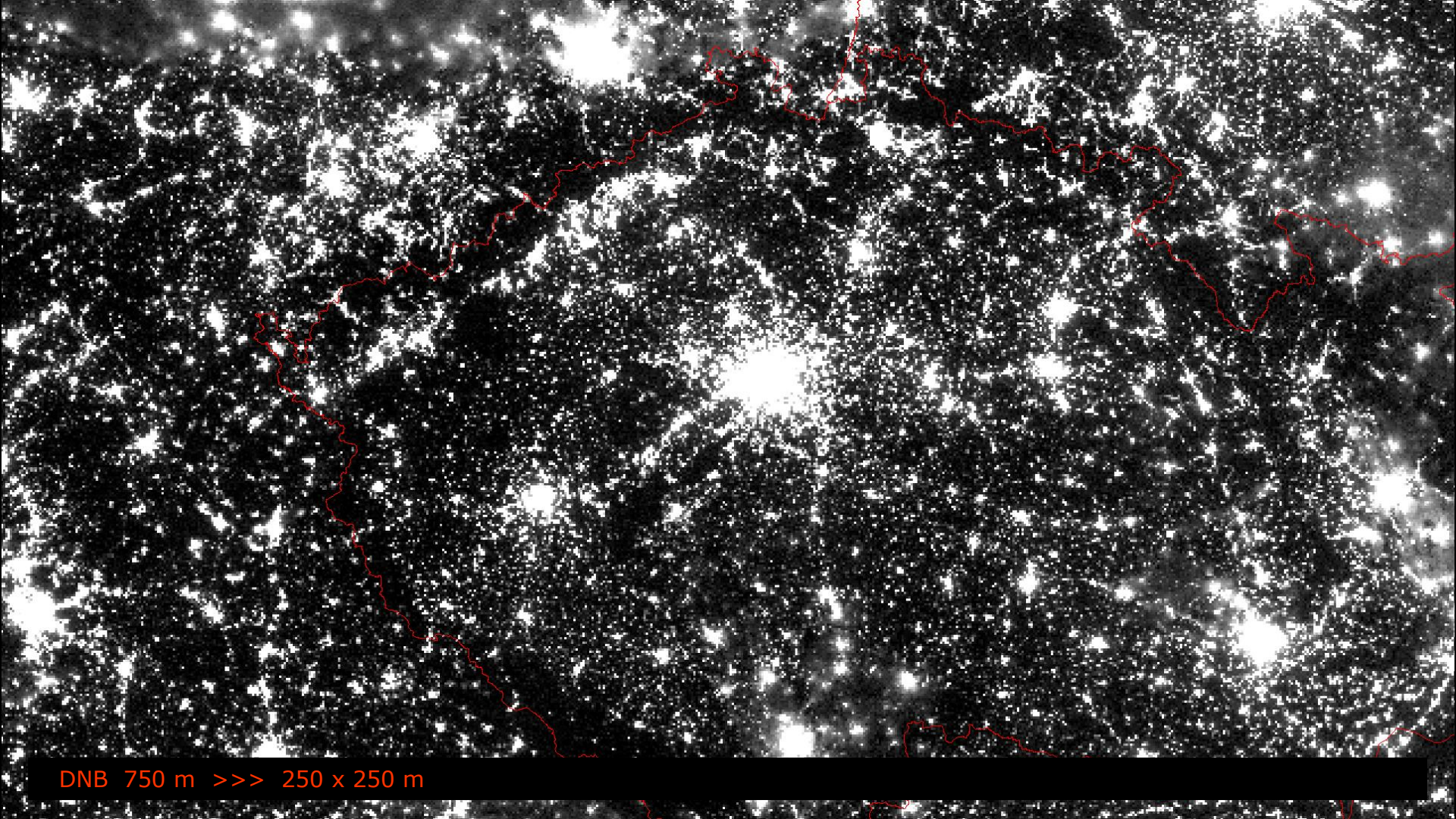
METOP AVHRR
1.1 x 1.1 km pixel size
Night Microphysics RGB

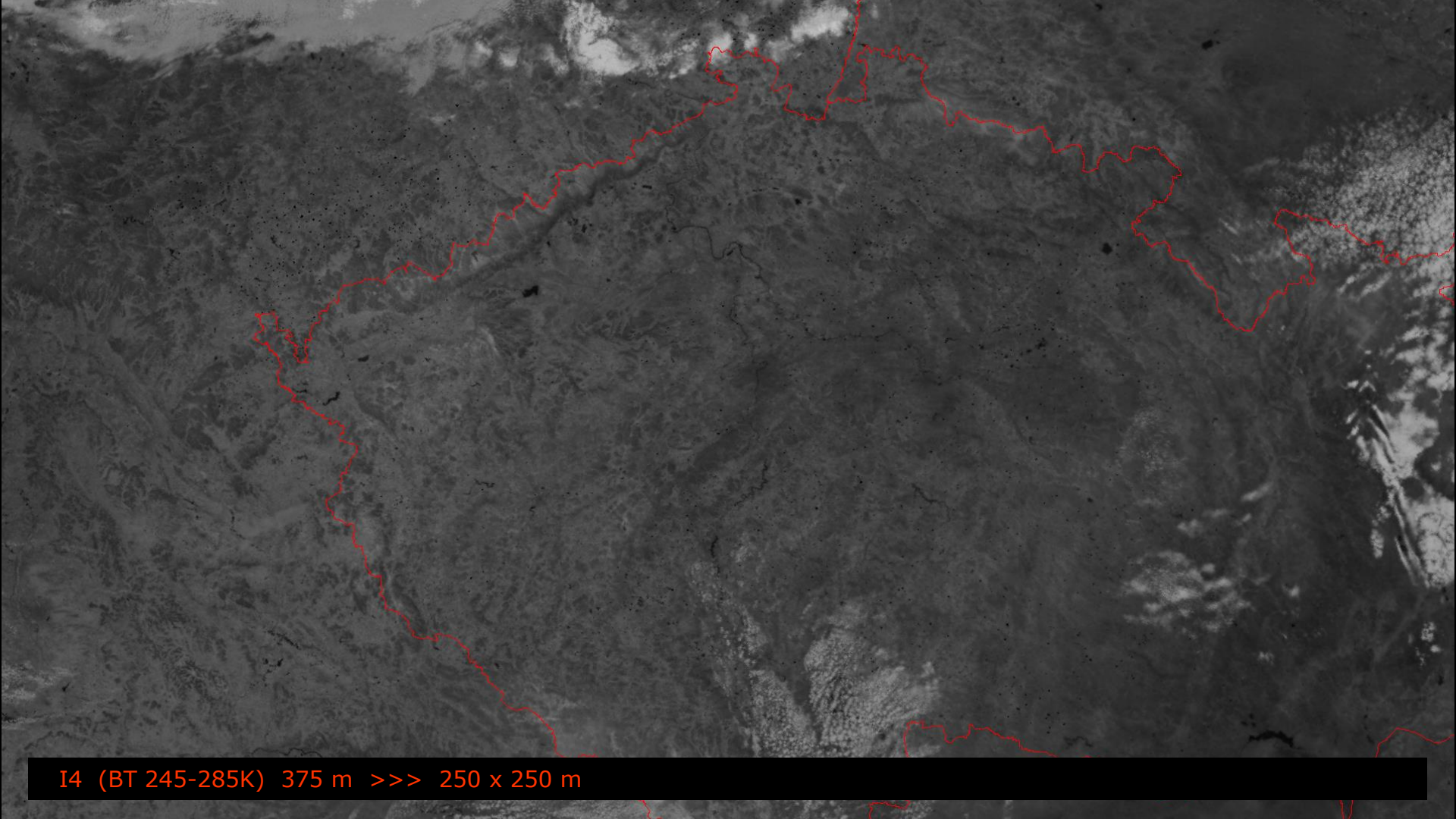


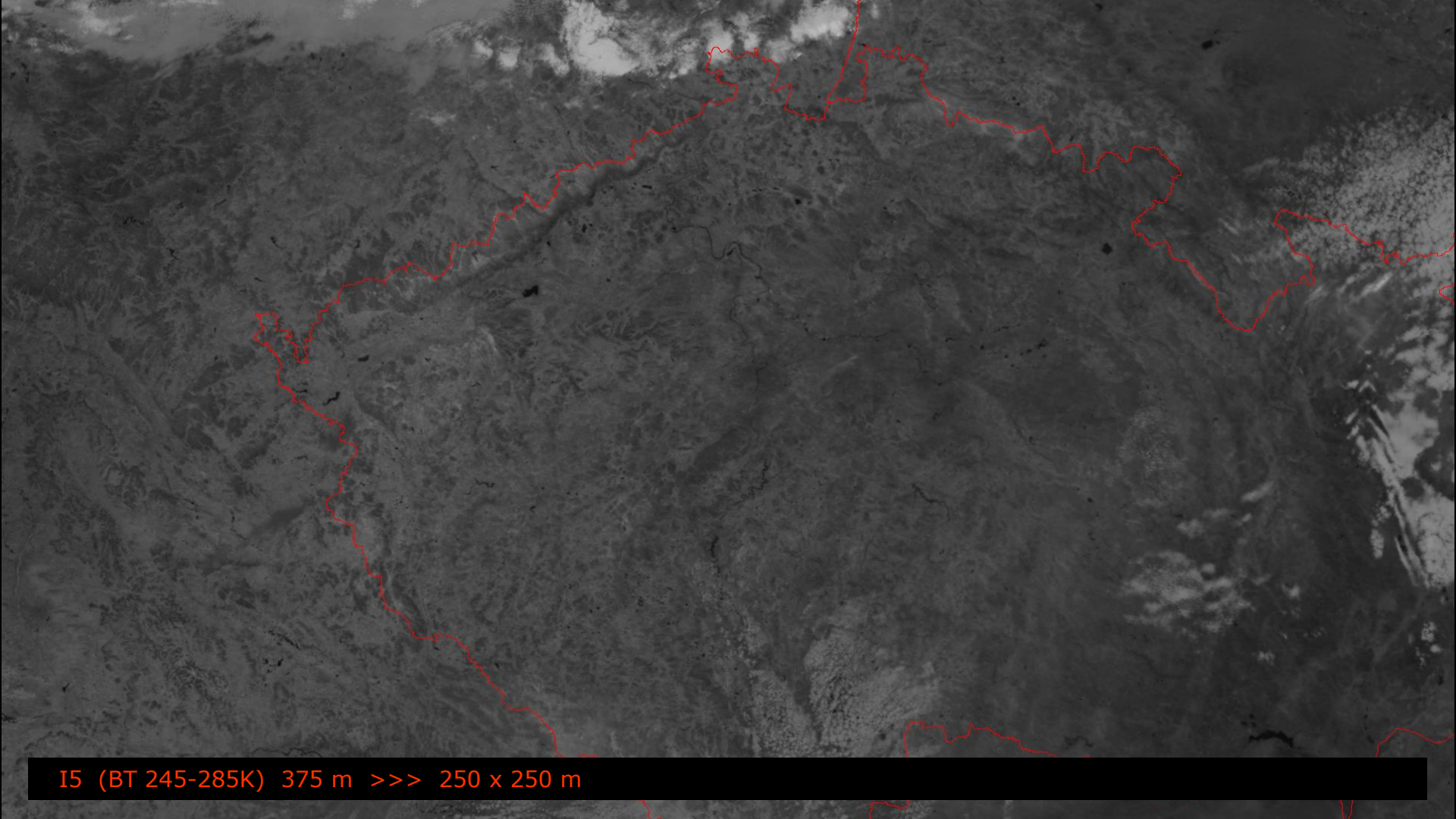
METOP AVHRR
1.1 x 1.1 km pixel size
Night Microphysics RGB

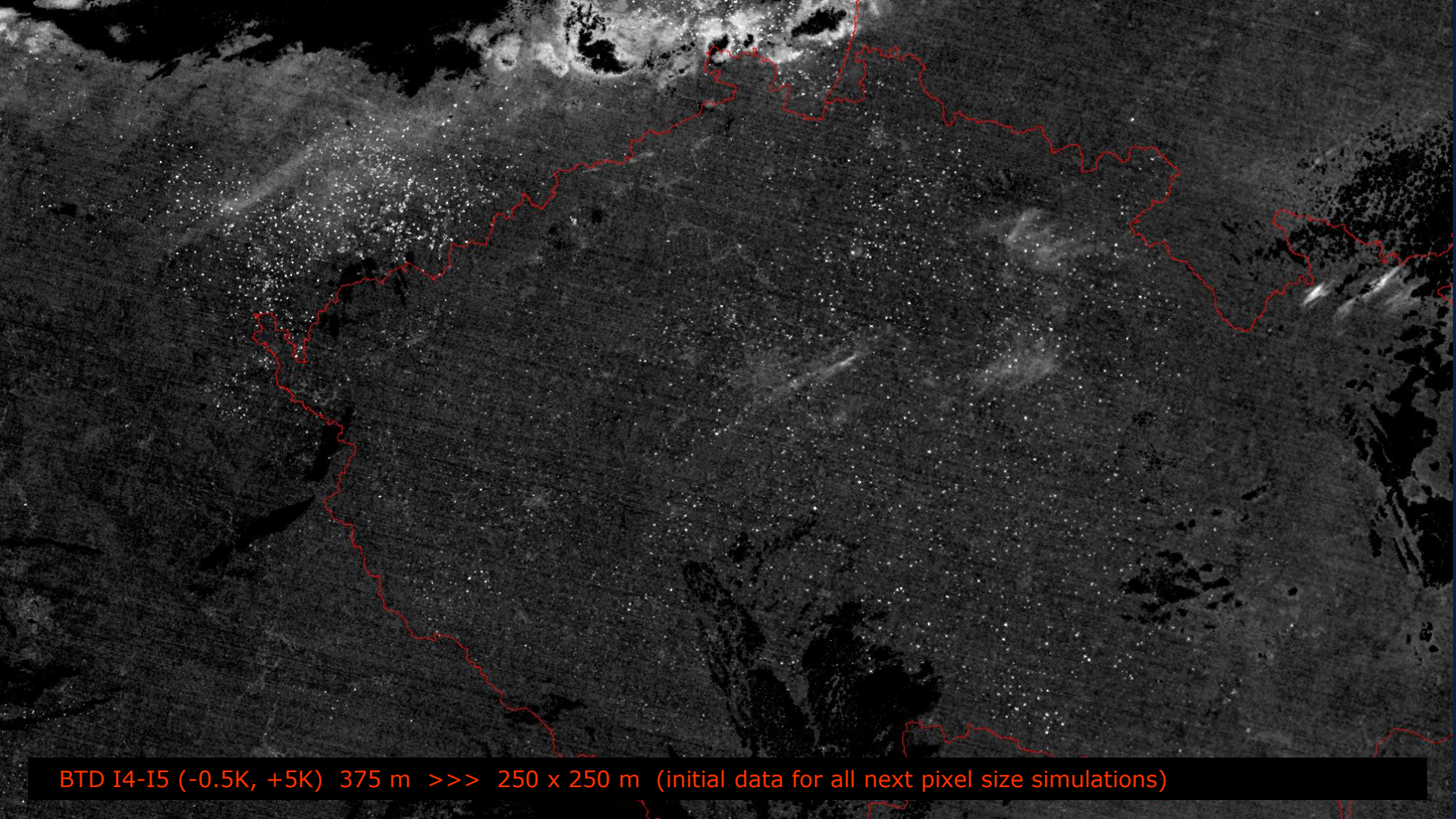
Temperature of bonfire – up to about 1400 K

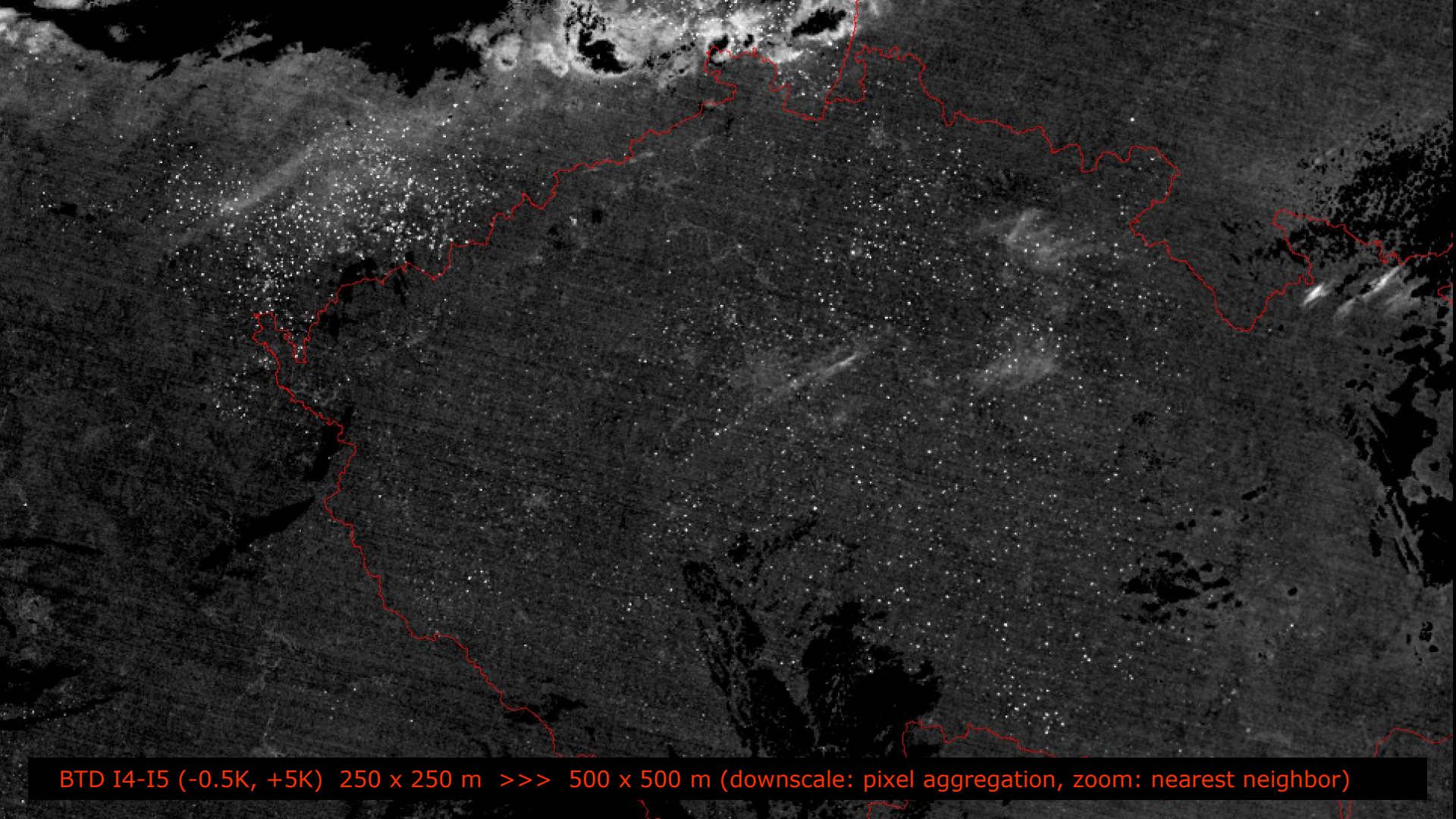

01 May 2019 01:20 UTC, NOAA 20
BTD I4-I5 375 m >>> (artificial) 250 x 250 m Transverse Mercator 50N 10E, bilinear resampling

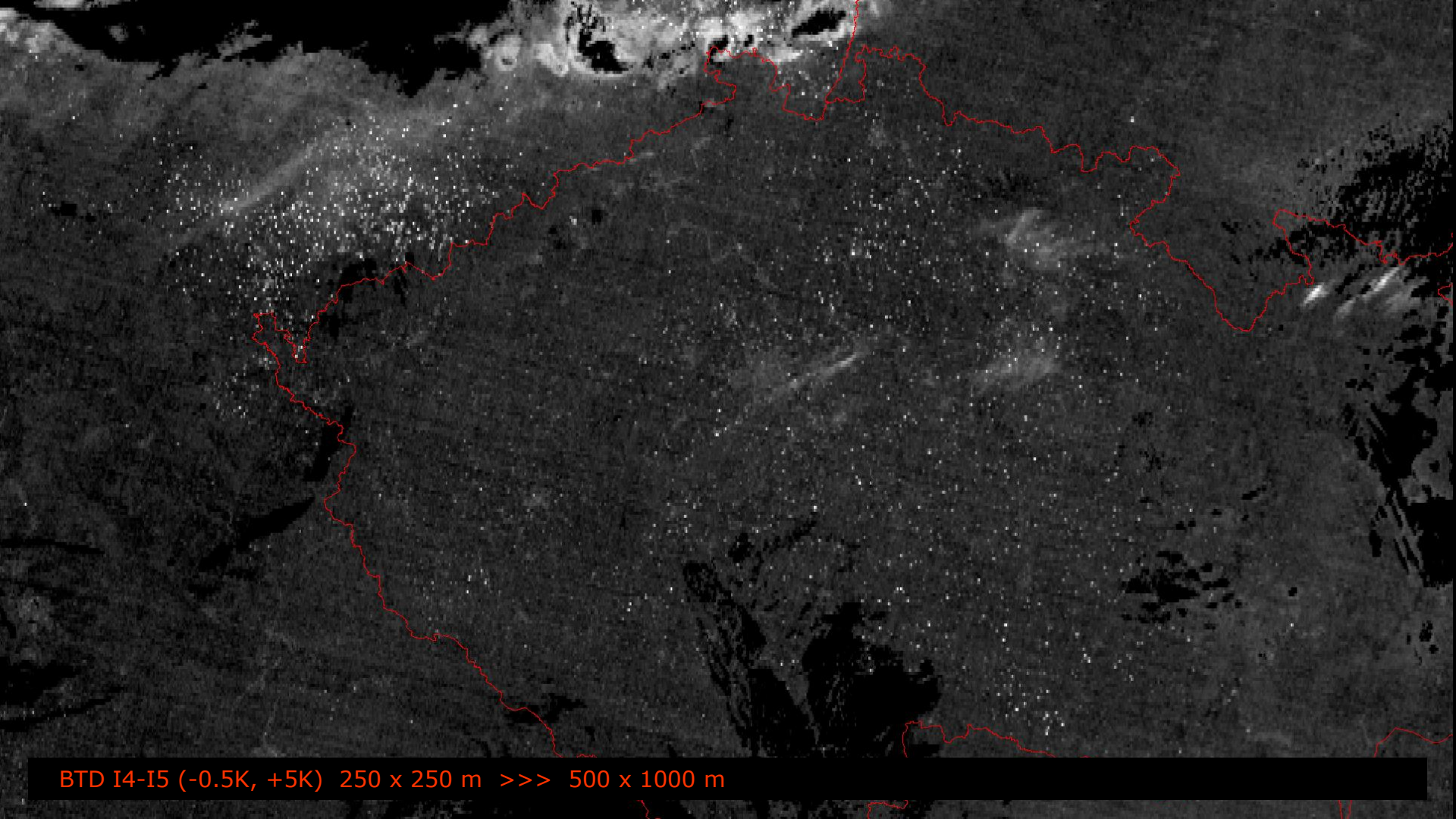

DNB 750 m >>> 250 x 250 m

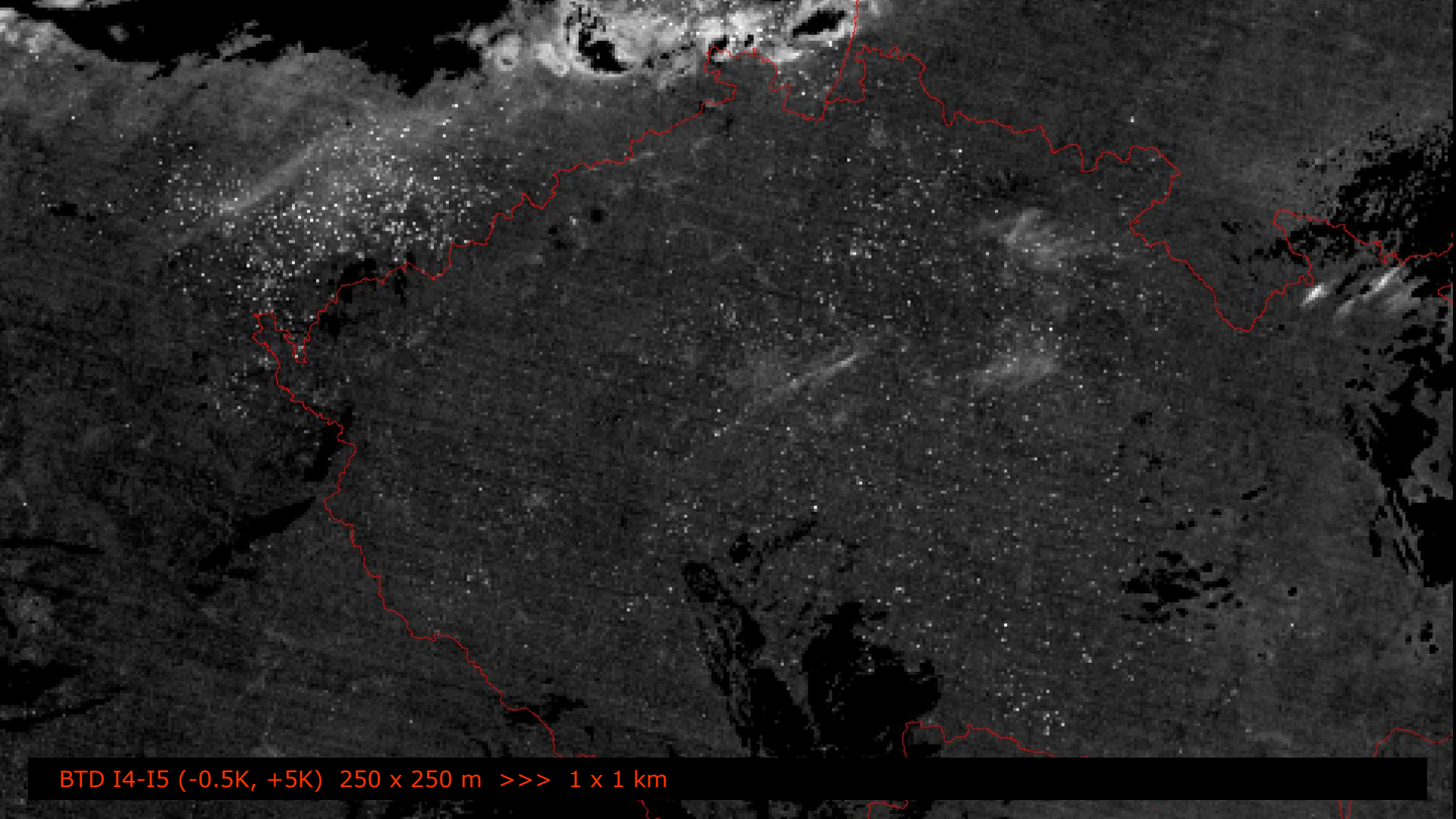

I4 (BT 245-285K) 375 m >>> 250 x 250 m

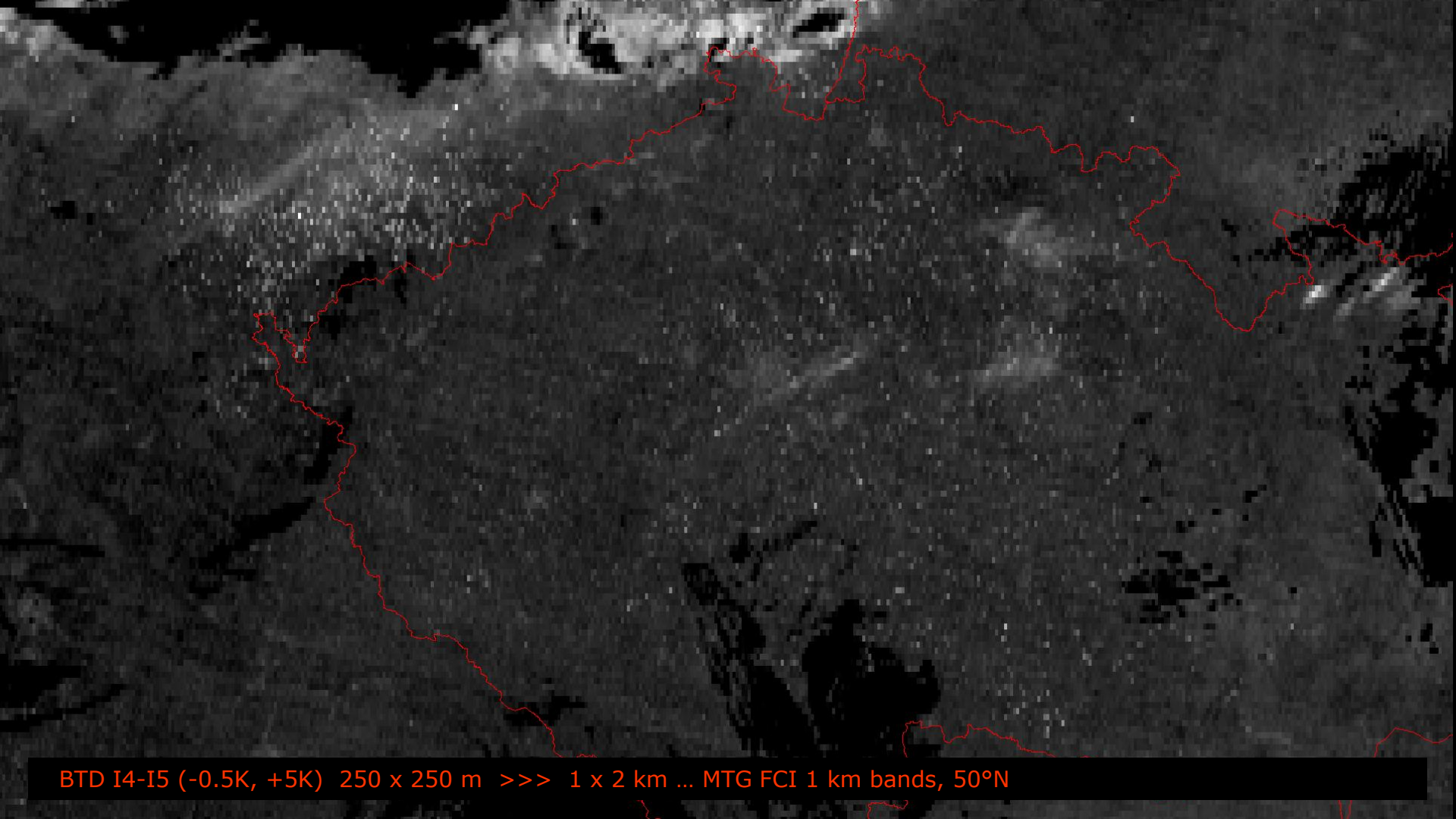

I5 (BT 245-285K) 375 m >>> 250 x 250 m

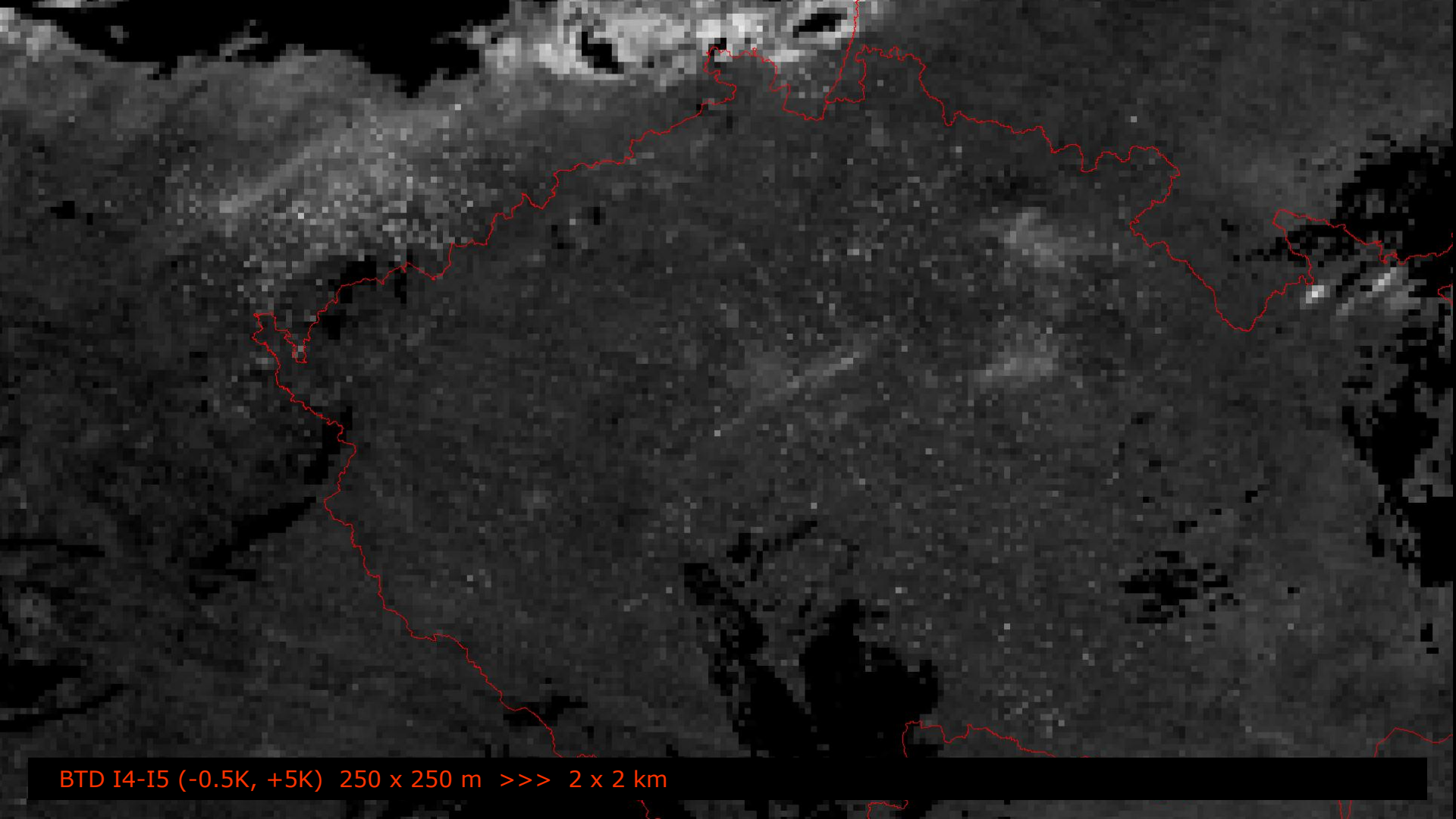

BTD I4-I5 (-0.5K, +5K) 375 m >>> 250 x 250 m (initial data for all next pixel size simulations)

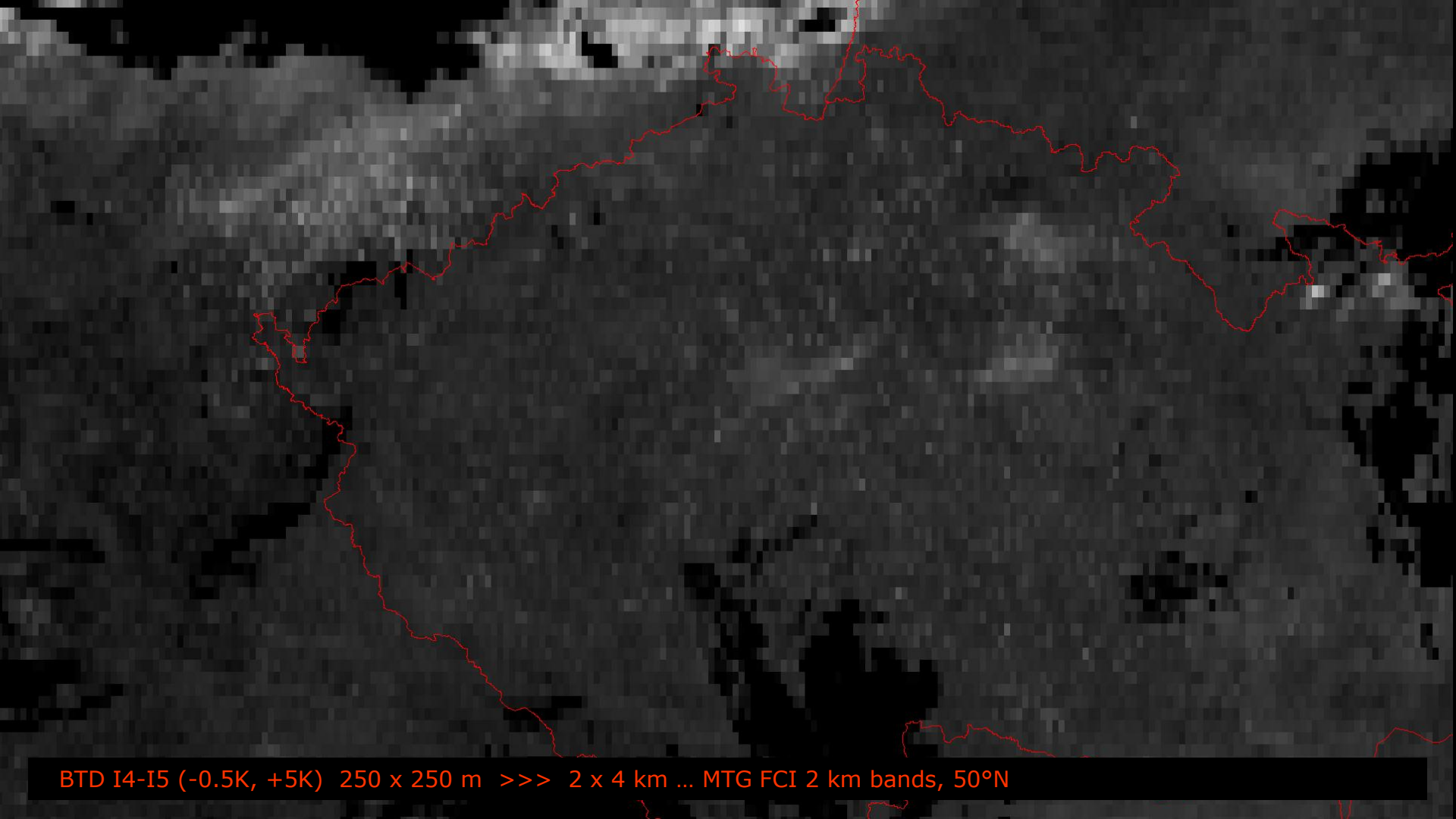

BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 500 x 500 m (downscale: pixel aggregation, zoom: nearest neighbor)

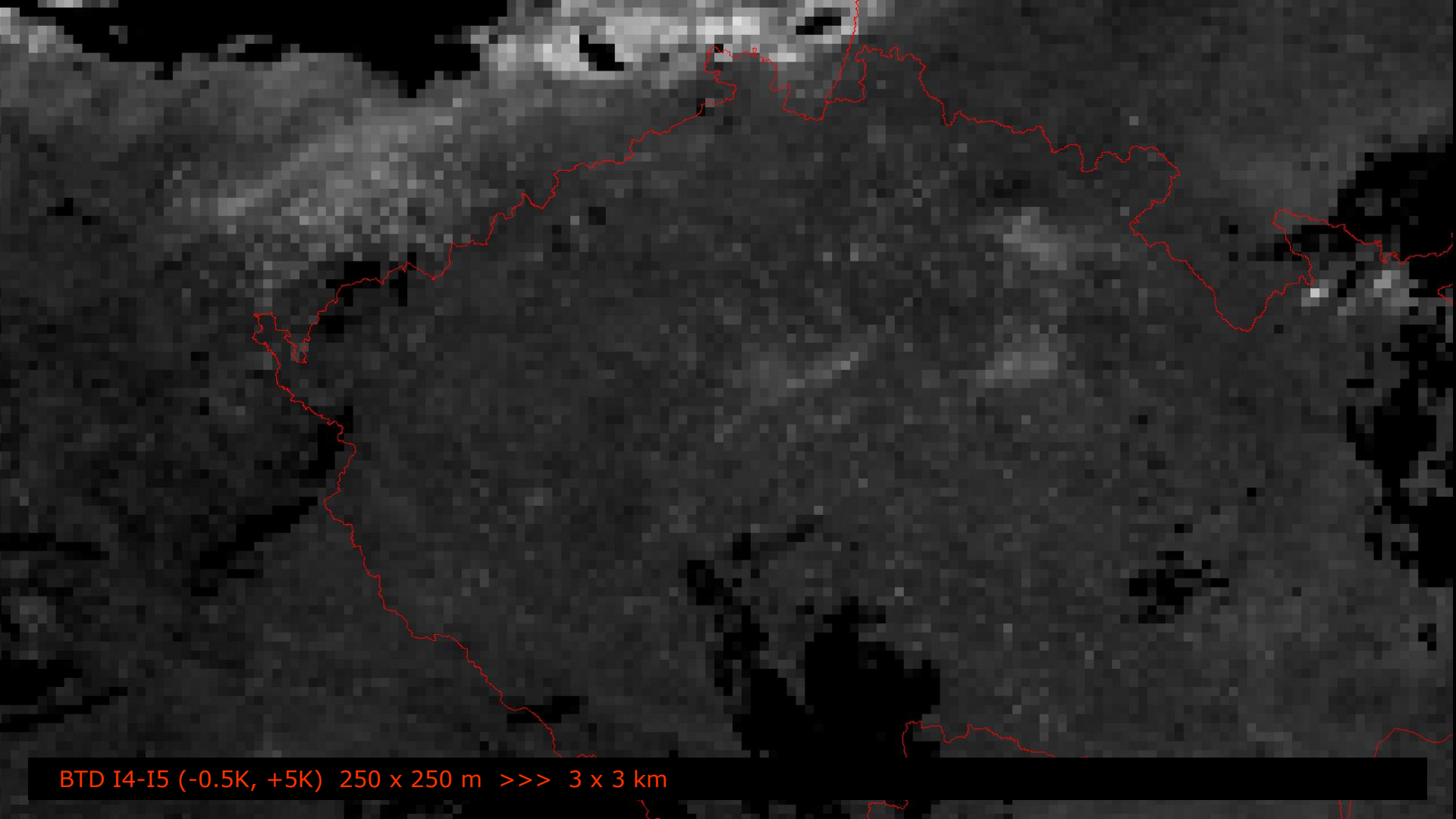

BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 500 x 1000 m

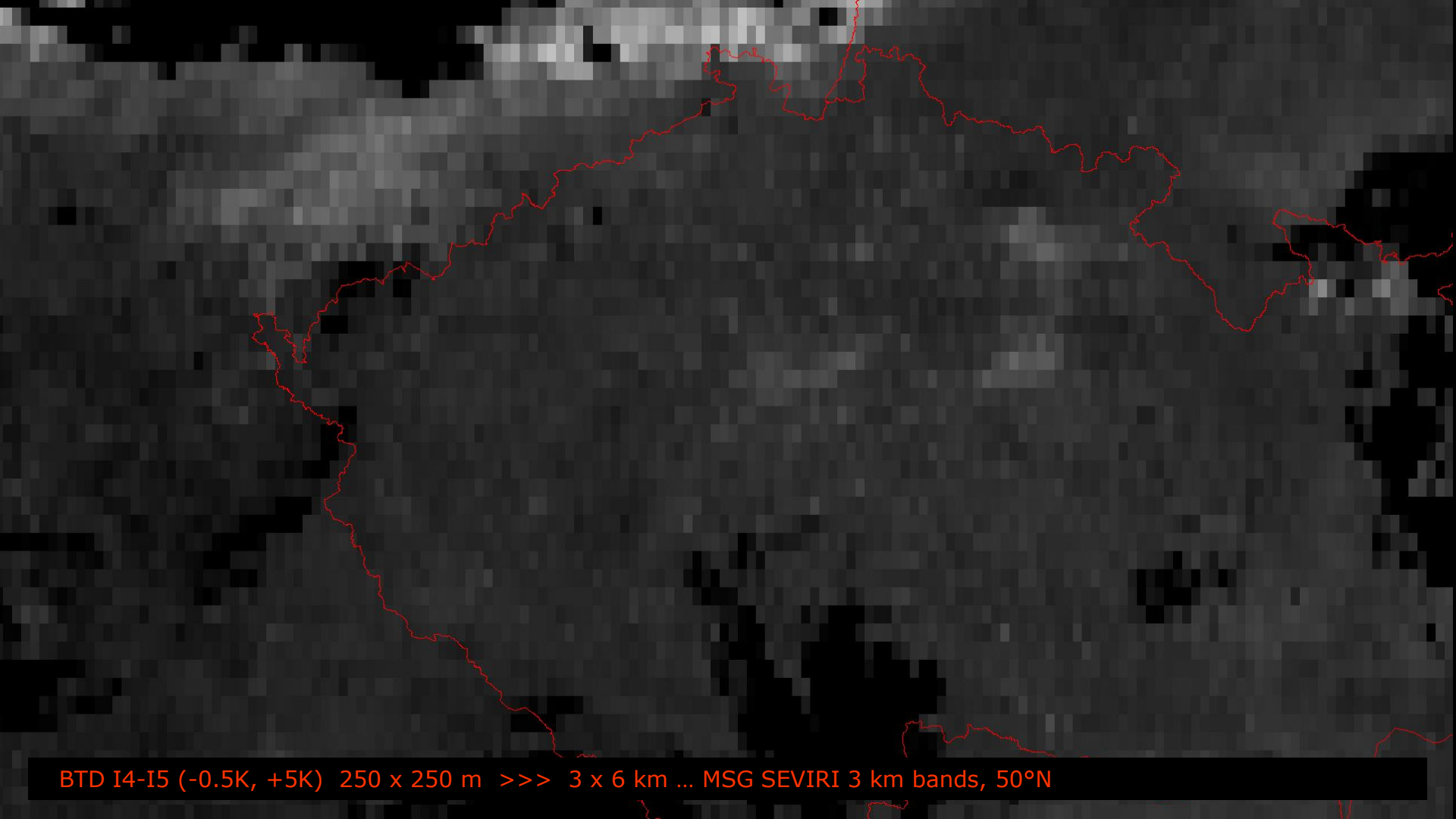

BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 1 x 1 km

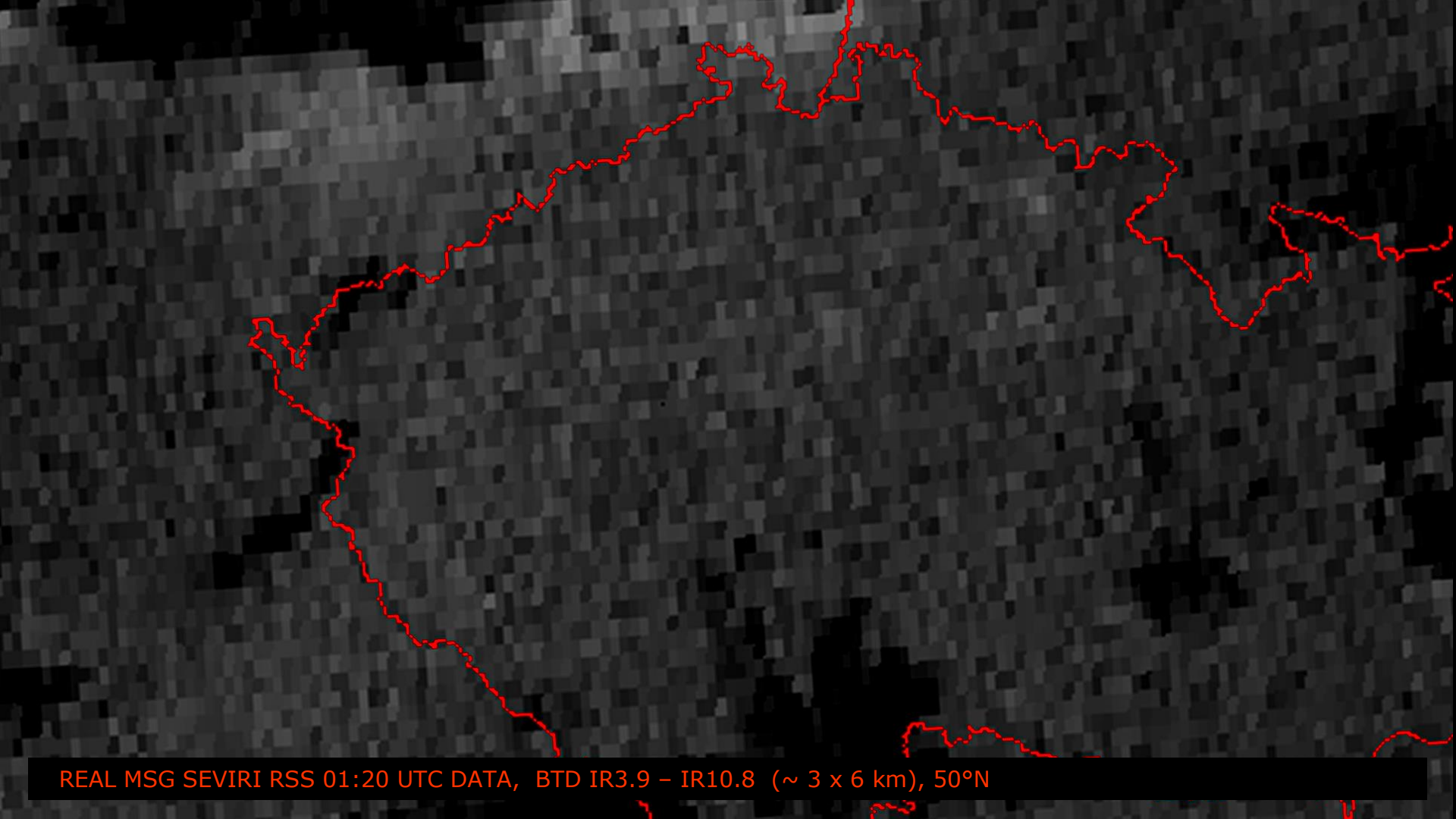

BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 1 x 2 km … MTG FCI 1 km bands, 50°N


BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 2 x 2 km


BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 2 x 4 km … MTG FCI 2 km bands, 50°N


BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 3 x 3 km


BTD I4-I5 (-0.5K, +5K) 250 x 250 m >>> 3 x 6 km … MSG SEVIRI 3 km bands, 50°N


REAL MSG SEVIRI RSS 01:20 UTC DATA, BTD IR3.9 – IR10.8 (~ 3 x 6 km), 50°N

The same as in previous slides, but without the initial projection into Transverse Mercator, using as source data for simulations the 375 m data in original satellite projection – more accurate.

Simulated for nominal meridian (0° or 9.5°E) at nadir view, and at 50°N

Original satellite projection (VIIRS)

EPS-SG METimage 0.5 km bands – nadir view

original 375 m data

500 x 500 m

500 x 1000 m

Original satellite projection (VIIRS)

original 375 m data

MTG FCI, 1 km bands – nadir view

1 x 1 km

MTG FCI, 1 km bands – 50°N view

1 x 2 km

Original satellite projection (VIIRS)

original 375 m data

MTG FCI, 2 km bands – nadir view

2 x 2 km

MTG FCI, 2 km bands – 50°N view

2 x 4 km

Original satellite projection (VIIRS)

original 375 m data

MSG SEVIRI, 3 km bands – nadir view

3 x 3 km

MSG SEVIRI, 3 km bands – 50°N view

3 x 6 km

Original satellite projection (VIIRS)

original 375 m data

MTG FCI 1 km HR bands – nadir view

1 x 1 km

MTG FCI 2 km NR bands – nadir view

2 x 2 km

Original satellite projection (VIIRS)

original 375 m data

MTG FCI 1 km HR bands – 50°N view

1 x 2 km

MTG FCI 2 km NR bands – 50°N view

2 x 4 km

Original satellite projection (VIIRS)

MTG FCI 1 km HR bands – 50°N view

MTG FCI 2 km NR bands – 50°N view

Significant difference between the 1 km HR and 2 km NR data !!!

original 375 m data

1 x 2 km

2 x 4 km

Summary – short and very simple:

The MTG FCI will be a significant step ahead compared to MSG SEVIRI as regards image pixel resolution.

The FCI HR bands will provide significantly better and more useful information than the corresponding FCI NR bands.