

# SNAP ThermalNoiseRemoval Operator Bug Report

## Summary

The SNAP `ThermalNoiseRemoval` operator produces severely corrupted output for certain Sentinel-1 GRD products acquired between late March and mid-April 2026. The `removeThermalNoise` parameter is ignored — setting it to `false` has no effect. Data corruption only ceases when the `ThermalNoiseRemoval` node is entirely removed from the processing graph.

## Environment

Component	Version
SNAP Desktop / Engine	13.0.0
Java	21.0.6
ESA IPF (all affected products)	004.03

## Affected Product

S1A\_IW\_GRDH\_1SDV\_20260322T040426\_20260322T040451\_063735\_08035B\_7DD0

- **Footprint:** POLYGON ((32.99 46.81, 33.43 48.31, 29.97 48.71, 29.63 47.22, 32.99 46.81)) (approx. lat 46.8°–48.7° N, lon 29.6°–33.4° E) Further images intersecting this footprint:
- At least 3 consecutive acquisition dates on orbit D138 are affected (2026-03-22, 2026-04-03, 2026-04-15). Most neighbouring dates (2026-02-02, 2026-02-14, 2026-03-10 and 2026-04-27) on the same orbit are healthy.
- 2026-02-26 is also corrupted, but with different signature (just skewed values. not further investigated here, root cause is probably the same.)

## Reproduction

**Minimum corrupt graph** (Read → TNR → Calibration → TC → dB → Write):

```
<graph id="Graph">
  <version>1.0</version>
  <node id="Read"><operator>Read</operator><sources/><parameters class="com.bc.ceres.binding
  <node id="ThermalNoiseRemoval"><operator>ThermalNoiseRemoval</operator><sources><sourcePro
  <node id="Calibration"><operator>Calibration</operator><sources><sourceProduct refid="The
  <node id="Terrain-Correction"><operator>Terrain-Correction</operator><sources><sourceProdu
  <node id="LinearToFromdB"><operator>LinearToFromdB</operator><sources><sourceProduct refid
  <node id="Write"><operator>Write</operator><sources><sourceProduct refid="LinearToFromdB"/
</graph>
```

**Minimum working graph** — remove the ThermalNoiseRemoval node (Read → Calibration → TC → dB → Write):

```
<graph id="Graph">
  <version>1.0</version>
  <node id="Read"><operator>Read</operator><sources/><parameters class="com.bc.ceres.binding
  <node id="Calibration"><operator>Calibration</operator><sources><sourceProduct refid="Read
  <node id="Terrain-Correction"><operator>Terrain-Correction</operator><sources><sourceProdu
  <node id="LinearToFromdB"><operator>LinearToFromdB</operator><sources><sourceProduct refid
  <node id="Write"><operator>Write</operator><sources><sourceProduct refid="LinearToFromdB"/
</graph>
```

## Visual Comparison

**With ThermalNoiseRemoval node (corrupt):**

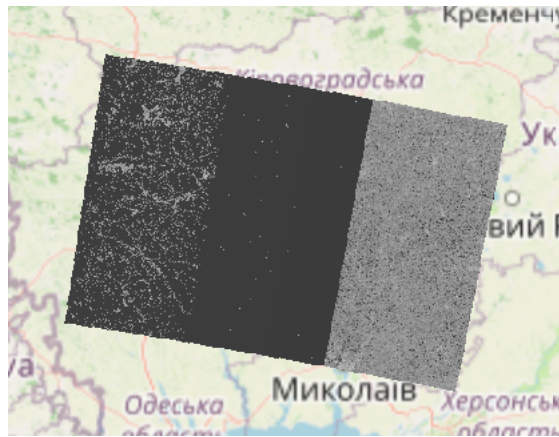


Figure 1: With ThermalNoiseRemoval node

**Without ThermalNoiseRemoval node (healthy):**

## Additional Notes

- The `removeThermalNoise=false` parameter is ignored — the operator produces identical (corrupted) output regardless of this flag.
- The raw GRD measurement data (uint16 DN) is healthy and uniform across all subswaths, confirming the corruption is introduced by SNAP.
- The artifact is subswath-dependent (IW1/IW2 affected, IW3 not), suggesting the operator reads corrupted noise annotation vectors from the SAFE product.



Figure 2: Without ThermalNoiseRemoval node