

# South African National Space Agency

**BUILDING RESILIENT COMMUNITIES THROUGH EARTH OBSERVATION**

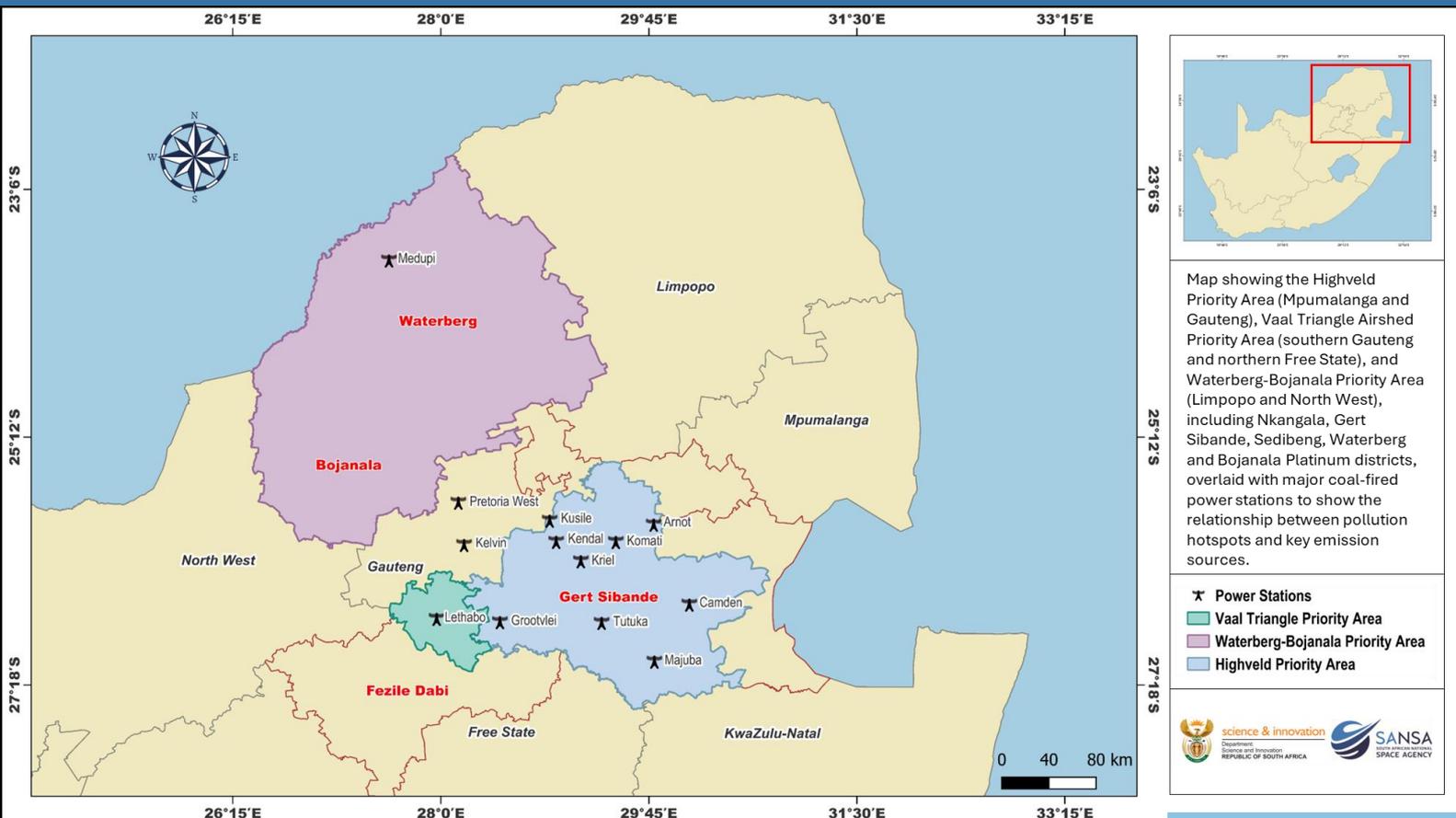


- Bridging the Air Quality Monitoring Gap
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- SANSA Air Quality Monitoring and Public Information Systems
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## Bridging the Air Quality Monitoring Gap: Leveraging Satellite Observations to Strengthen Environmental Data Coverage

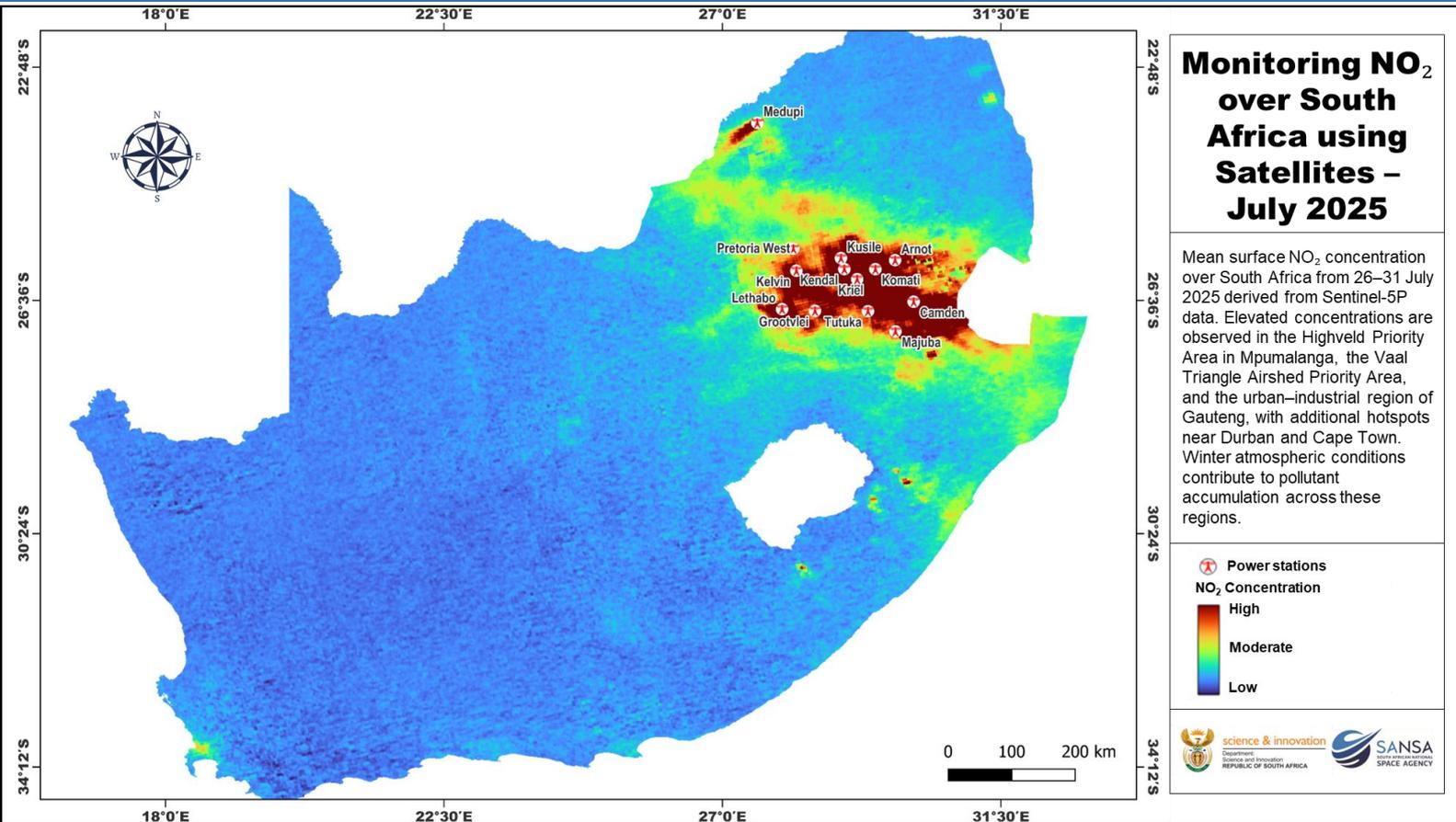
The number of environmental monitoring stations has been declining in many regions, resulting in reduced availability of continuous in situ data needed for effective environmental assessment and decision-making. In this context, remote sensing observations provide an important complementary capability by offering consistent, wide-area, and repeatable measurements from satellite platforms. These observations help bridge the gap created by the reduction in ground-based monitoring infrastructure, enabling improved air quality monitoring, analysis, and management.

# SANSA Mapping of Air Pollution Priority Areas



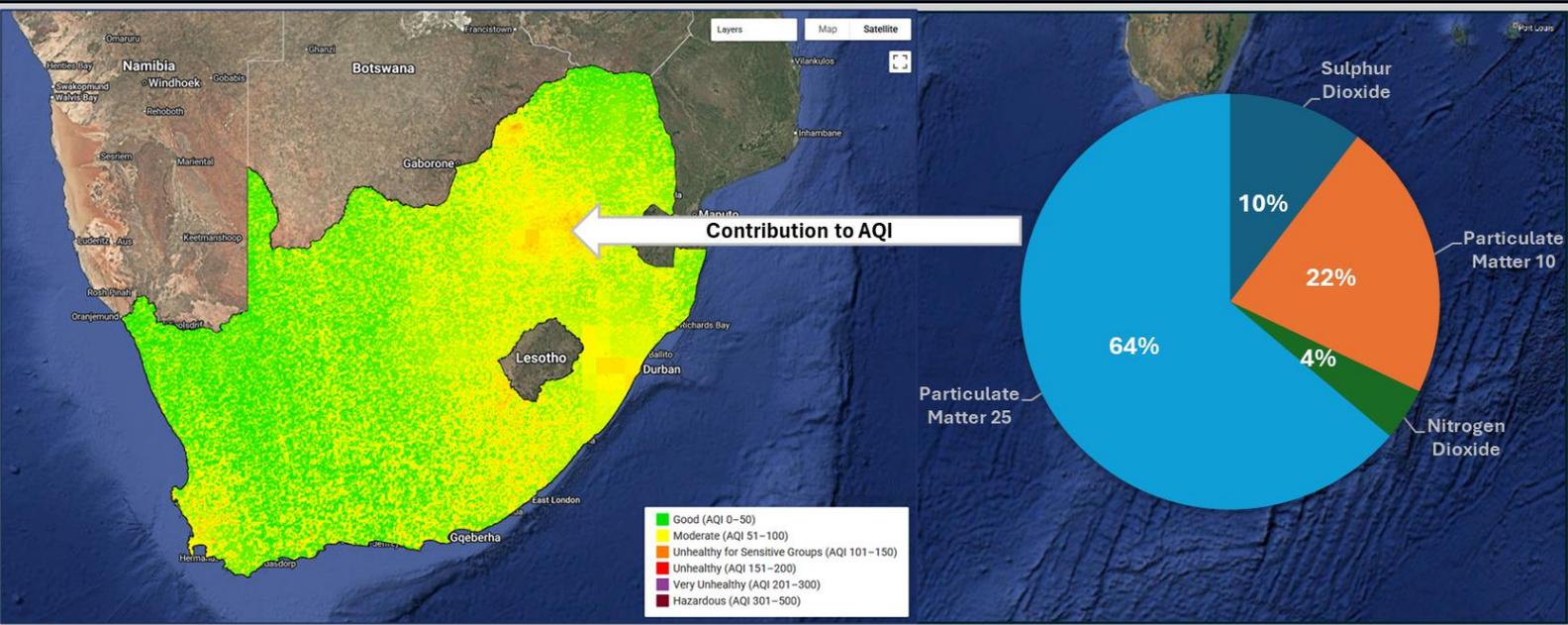
To address severe pollution levels, the South African government declared three Air Pollution Priority Areas: Highveld Priority Area, Vaal Triangle Priority Area and Waterberg-Bojanala Priority Area. These regions were identified due to high pollutant concentrations and significant population exposure, particularly where industrial activity overlaps with densely populated communities. Many coal-fired power stations and heavy industries are located within or near these areas, increasing the potential for long-term exposure to harmful pollutants. Through Earth Observation and geospatial analysis, South African National Space Agency (SANSA) provides environmental intelligence that helps scientists, policymakers and the public understand where pollution occurs, how it spreads and how it affects communities.

# SANSA Geospatial Analysis of Atmospheric Pollution



SANSA applies satellite-based Earth Observation techniques to monitor atmospheric pollutants over large areas. One example is the mapping of nitrogen dioxide (NO<sub>2</sub>), a key indicator of emissions from combustion sources such as power stations, vehicles and heavy industry. Through geospatial processing and visualisation, SANSA can identify pollution hotspots and spatial trends across the country. These analyses help reveal areas where industrial emissions are most concentrated and where communities may be exposed to higher pollution levels.

# SANSA Air Quality Monitoring and Public Information Systems



To improve public access to environmental information, SANSA has developed an Air Quality Dashboard that integrates satellite observations, atmospheric modelling and environmental data. The platform provides near real-time air quality information using the Air Quality Index (AQI) scale from 0 to 500, categorised as: Good, Moderate, Unhealthy for Sensitive Groups, Unhealthy, Very Unhealthy, and Hazardous. The dashboard also displays the relative contribution of different pollutants to the AQI, helping users better understand the drivers of poor air quality.

The screenshot shows the SANSA Air Quality Dashboard interface. On the left, there is a control panel for 'Air Quality Analysis' with fields for Start Date (07/10/2025), End Date (07/31/2025), Region, Country (South Africa), and a 'RUN ANALYSIS' button. Below this is a legend for AQI categories. The main area is a map of South Africa showing a detailed air quality heatmap. At the top right, there are navigation links for HOME and HELP.

# Supporting Evidence-Based Environmental Decision Making

The South African National Space Agency (SANSA) is committed to advancing evidence-based environmental decision-making through scientific research, knowledge sharing, and strategic collaboration. SANSA researchers regularly publish findings in both local and international scientific journals and present their work at national and global conferences. Through these engagements, SANSA contributes to the global body of knowledge on Earth observation and environmental monitoring while strengthening South Africa's role in the international space and environmental science community. The organisation also actively identifies opportunities to collaborate with local municipalities and government stakeholders, ensuring that geospatial insights and satellite-derived data support practical solutions for air quality management and environmental planning.



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