

**INDUSTRY STANDARD OF THE
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**Technical specification for straw burning monitoring based on
satellite remote sensing**

卫星遥感秸秆焚烧监测技术规范

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Foreword

To implement the "Environmental Protection Law of the People's Republic of China" and the "Air Pollution Control Law of the People's Republic of China" to guide satellite remote sensing monitoring of straw burning, to prevent air pollution, improve air quality, and develop this standard.

This standard specifies the method of satellite remote sensing monitoring of straw burning, product production, quality control and so on.

Appendix A of this standard is an informative annex.

This standard is the first release.

This standard is formulated by the Department of Eco-Environmental Monitoring, the Department of Regulations and Standards of the Ministry of Ecology and Environment.

This standard was drafted. Satellite Environment Application Center of the Ministry of Environmental Protection.

This standard is verified by. Jiangsu Environmental Monitoring Center, Beijing

Environmental Monitoring Center, Heilongjiang Province Environmental Science Research hospital.

This standard is approved by the Ministry of Ecology and Environment on December 26, 2018.

This standard has been implemented since June 1, 2019.

This standard is explained by the Ministry of Ecology and Environment.

1 Satellite remote sensing straw incineration monitoring technical specification

1 Scope of application this standard stipulates the use of polar-orbiting satellites for remote sensing monitoring of straw burning, product production, quality control and other content.

This standard is applicable to satellite remote sensing monitoring of straw burning.

2 Normative references

The contents of this standard refer to the terms in the following documents.

GB/T 32453-2015 Satellite Earth observation data product classification and classification rules.

3 Terms and definitions

The following terms and definitions apply to this standard.

Brightness temperature the black body temperature equal to the radiation output of the observed object, which is numerically equivalent to the radiant temperature, quoted from GB/T 32453-2015.

Apparent reflectance Refers to the ratio of the reflected energy at the top of the atmosphere to the incident energy of the sun.

Suspected fire point of burning Refers to the straw burning point to be verified by the technical methods of this standard.

Suspected fire point confidence of straw burning Refers to the probability that the suspected fire point of straw burning is the actual fire point monitored by the technical methods of this standard.

4.1 Monitoring principle

Differences in brightness temperature between mid-infrared and thermal infrared based on suspected fire point pixels and background normal temperature pixels in straw burning Do not heat abnormal points, combined with land classification data, extract suspected fire

points from straw burning.

4.2 Monitoring means

Straw incineration monitoring is carried out using optical and infrared sensors of polar-orbiting satellites. The sensor should have a range of 0.65 μ m 2 visible light red band, near-infrared band near 0.8 μ m, mid-infrared band near 4 μ m, near 11 μ m and 12 μ m refer to Appendix A for the thermal infrared band and band settings.

4.3 Monitoring content

The location, quantity, and reliability of suspected fire spots in straw burning.

4.4 Monitoring process

The satellite remote sensing monitoring process for straw burning is shown in Figure 1.

Satellite remote sensing data Remote sensing data preprocessing Straw burning suspected fire point extraction Estimation of reliability of suspected fire point in straw burning Land use data Monitoring products to produce geographic information data Thermal anomaly extraction

Figure 1 Straw burning satellite remote sensing monitoring process

5.1 Remote sensing data preprocessing

First, the satellite remote sensing data is subjected to quality inspection, radiation correction and geometric correction, and then the visible light and near infrared waves are calculated.

The apparent reflectance of the segment and the brightness temperature of the mid-infrared and thermal infrared bands.

The apparent reflectance is calculated as follows.

Cos

ESUN

In the formula.

rho -- apparent reflectance;

--constant, sr;

- radiance, W/(m² · sr · μ m);

-- the distance between the sun and the earth, the astronomical unit;

ESUN - the average solar spectrum irradiance at the top of the atmosphere, W/(m² · μ m);

