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Assessing winter oilseed rape freeze injury based on Chinese HJ remote sensing data

Key words:

Brassica napus, Freeze injury, Remote sensing, Crop monitoring, HJ-CCD

Research Summary

- Extraction of oilseed rape growing regions in the freeze injury-experienced growing season
- Assessing the damage situation after freeze
- Investigating potential influencing factors to damage extent

Oilseed rape freeze injury occurred in Hefei in January, 2011

Specifications of the multispectral remote sensors onboard Chinese HJ-1A /1B satellites

Platform	Payload	Band	Spectral range (μm)	Spatial resolution (m)	Swath width (km)	Revisit cycle (d)
HJ-1A/1B	CCD1 & CCD2	1	0.43-0.52	30	360	4
		2	0.52-0.60	30		
		3	0.63-0.69	30		
		4	0.76-0.90	30		
HJ-1B	IRS	5	0.75-1.10	150	720	4
		6	1.55-1.75	150		
		7	3.50-3.90	150		
		8	10.50-12.50	300		

The role of HJ data in this study

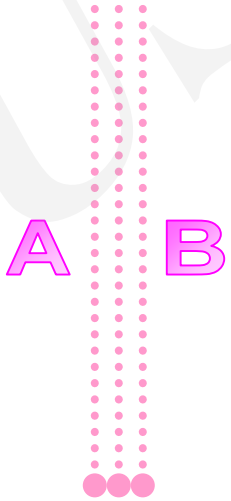
1. Identifying oilseed rape fields
2. Indicating crop growth status and its variation
3. Retrieving land surface parameters, e.g. LST, soil moisture

- Other adopted remote sensing datasource:
  - Terra-MODIS
  - ASTER-GDEM

Innovation points

Using remote sensing to monitor the freeze injury of winter oilseed rape has not been reported previously

This article proposes an idea and method to obtain the oilseed rape growing regions during the freeze injury-experienced growing season



The research reveals the relationships between degree of damage and several potential environmental and vegetation factors

Main achievements

1. Oilseed rape growing regions in the wintering period and before the freeze—flowering phase-based classification is not effective in identifying oilseed rape when it suffers freeze injury

2. Freeze injury affected areas and the spatial distribution of different damage levels in the study area

3. Reveal of damage-level influencing factors, the ways they affect the damage extent, and the corresponding rank of each factor in determining the degree of damage

4. Possible reasons of the influencing factors (terrain, pre-freeze growth status and soil moisture) contribute to degree of damage