Data Paper

Hideki KOBAYASHI, Rikie SUZUKI, Wei YANG, Hiroki IKAWA, Tomoharu INOUE, Hirohiko NAGANO and Yongwon KIM. Spectral reflectance and associated photograph of boreal forest understory formation in interior Alaska. Polar Data Journal, 2018, 2, 14–29, https://doi.org/10.20575/00000004

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1st submission

Editor Start Date: 2/7/2018

Editor Stop Date: 8/10/2018

Reviewer #2 (4/16/2018–5/7/2018)

Reviewer #3 (7/8/2018–8/4/2018)

Reviewer #2 : Anonymous

The authors measured spectral reflectances of 44 typical understory in five 30-m long transects in Alaska. The data set is useful for scientific studies in arctic environmental changes.

Reviewer #3 : Anonymous

General comments: The manuscript entitled “Spectral reflectance and associated photograph of boreal forest understory formation in interior Alaska” by Hideki Kobayashi et al. describes compiled dataset on spectral reflectance measured at the variety of understory vegetated surfaces over boreal to Arctic region in Alaska, USA. These data are substantially valuable for comparison with and validation for the in-situ ecosystem observation, satellite remote sensing and outputs of ecosystem modeling. The manuscript is basically well-written on the outline and procedure of the measurements. However, the reviewer found several insufficiencies on explanation of the dataset as follows:

(1)

The information on the observation date and periods should be noted in the main text. In particular, understory formation data was measured in July or September at each site. The authors should add to explain what meanings these data observed these months have and how the data will be used for. I guess the data should be observed in both mature season (all vegetation was green) and senescence season (yellow and red as shown in September) at each site for practical use for the validation. But each site only contains of data in one of the two months.

(2)

For the transect data, I could not find any descriptions on vegetation composition at each observation points. Authors should add descriptions at least what kinds of plants were dominant from photograph at each transect point.

Specific Comments: Introduction The authors may add descriptions on meanings of spectral reflectance data at understory in boreal and Arctic region. What kinds of scientific target will be suggested using this dataset? For example,

the possibilities to validate for phenology, LAI, leaf conditions derived from remote sensing and ecosystem modeling.

P.10 What is “TECHINICAN VALIDATION”? Technical validation?

Authors Response:

To Reviewer #3

We would like to thank the reviewers for their comments. We have addressed each comment by the reviewer #3 and the manuscript has been substantially improved. We believe that the current version of manuscript is suitable for publication in Polar Data Journal.

Authors,

General comments: The manuscript entitled "Spectral reflectance and associated photograph of boreal forest understory formation in interior Alaska" by Hideki Kobayashi et al. describes compiled dataset on spectral reflectance measured at the variety of understory vegetated surfaces over boreal to Arctic region in Alaska, USA. These data are substantially valuable for comparison with and validation for the in-situ ecosystem observation, satellite remote sensing and outputs of ecosystem modeling. The manuscript is basically well-written on the outline and procedure of the measurements. However, the reviewer found several insufficiencies on explanation of the dataset as follows:

Reviewer #3 Comment 1

(1) The information on the observation date and periods should be noted in the main text. In particular, understory formation data was measured in July or September at each site. The authors should add to explain what meanings these data observed these months have and how the data will be used for. I guess the data should be observed in both mature season (all vegetation was green) and senescence season (yellow and red as shown in September) at each site for practical use for the validation. But each site only contains of data in one of the two months.

Response:

We have added the dates of observation in the main text. We measured understory spectral mainly in two periods (July and September) to obtain various growing stages (green matured plants, and senescence plants) of understory plants. As the reviewer suggested, ideally the spectral data should be measured both in mature season (all vegetation was green) and senescence season (yellow and red as shown in September) at each site. However, due to the logistical reasons (the site is in the remote area, and the observation requires good sky conditions), we have not obtained both season in each site yet. In the future, we have a plan to add more samples including two season observations. Nonetheless, the data are still useful for satellite validation, algorithm development, and pure spectra of various understory formation for mixture analysis because the data can be used for at least one snapshot validation of satellite products. We have modified the Method section according to the comment by the reviewer #3.

Page 6 in "Method":

"The spectral reflectances of 44 understory formations were obtained in the Poker Flat Research Range (PFRR) of the University of Alaska, Fairbanks in summer and early autumn seasons (July 14, 2013, September 8 to 9, 2014). In

addition, understory spectra covered with snow were measured in March 25, 2015. These measurements were performed to obtain various growing stages (green matured plants, and senescence plants) of understory plants."

Reviewer #3 Comment 2

(2) For the transect data, I could not find any descriptions on vegetation composition at each observation points. Authors should add descriptions at least what kinds of plants were dominant from photograph at each transect point.

Response:

The dominant plant species at each transect point was only recorded in the data sets files. In this revised version, we added the dominant species information at every observation point in the tables (Please see Table 2 to 6).

Reviewer #3 Comment 3

Specific Comments: Introduction The authors may add descriptions on meanings of spectral reflectance data at understory in boreal and Arctic region. What kinds of scientific target will be suggested using this dataset? For example, the possibilities to validate for phenology, LAI, leaf conditions derived from remote sensing and ecosystem modeling.

Response: Some description regarding the comments by the reviewer was provided in the third paragraph of the "Back ground and Summary" section. We have added further description to make the scientific target clearer.

Page 3

"Spectroscopic measurements of vegetation are a useful tool to identify species and their biochemical characteristics and to estimate the biophysical parameters such as understory leaf area index, above ground biomass. The spectral measurements are made not only at the ground level, but also by remote sensing from satellites and aircrafts. In fact, several past studies have made an attempt to monitor the understory spectral reflectance from satellites to obtain the large-scale spatial variability of species and their temporal changes12-13. These satellite measurements often contain noises and errors due to cloud contamination, insufficient radiometric corrections, and uncertainties in retrieval algorithms. Ground-based understory measurements provide the validation data sets for remote sensing of understory reflectance."

Reviewer #3 Comment 4

P.10 What is "TECHINICAN VALIDATION"? Technical validation?

Response:

Thank you for your careful reading. We have now fixed it as "Technical Validation"

2nd submission

Editor Start Date: 8/22/2018

Editor Stop Date: 9/5/2018

Editor Comments to the Author:

Editorial Office's note

Calcurate checksum date: 15/11/2017

Algorithm: SHA256

Hash: 902B0DDCACE6894C872409E6BBBC49E824EE0B3BDF288641DA7E47E18A4C805D

Path:

https://ads.nipr.ac.jp/portal/kiwa/ProductsSelect.action?referer=summary&downloadList=ADS%3AA20180201-001%3A1.00

Original Data

Kobayashi, H., Suzuki, R., Yang, W., Ikawa, H., Inoue, T., Nagano, H., and Kim, Y. Arctic Data archive System (ADS), 1.00, NIPR, 2018, https://doi.org/10.17592/001.2018020101.