Lake Mountain landscape post Black Saturday fires

Key Topics:

- fire [2]
- fire impacts [3]
- remote sensing [4]

Fire surveillance and hazard mapping [5]

This project sought to optimise the use of earth observing systems for active fire monitoring by exploring issues of scale, accuracy and reliability, and to improve the mapping and estimation of post-fire severity and fuel change through empirical remote sensing observations. A particular focus was on the analysis of data obtained from Himawari-8, which is able to provide updated imagery on a 10 minute basis.+++++

Project: detail Notabs

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Description

This project sought to optimise the use of earth observing systems for active fire monitoring by exploring issues of scale, accuracy and reliability, and to improve the mapping and estimation of post-fire severity and fuel change through empirical remote sensing observations. Understanding the trade-offs between sensors and their ability to map and measure fire-related attributes over a range of different landscapes and fire scenarios is important.

The study has improved the accuracy of vegetation monitoring for flammability, as well as saving critical man hours through the development of a beta smartphone application. Fuels3D, built on the Android platform, allows land managers to rapidly collect imagery in the field and uses computer vision and photogrammetric techniques to calculate measures of fuel and severity metrics.

Additionally, this project is leading Australian contributions to integrate and enhance Australianled existing disaster monitoring and reporting systems with next generation earth observation technology and systems from the German Aerospace Centre and other agencies.

Outcomes are enabling satellite measures of fire activity to be made, which in turn have the potential to inform or support efforts in bushfire response planning and fire rehabilitation efforts. A particular focus is on the analysis of data obtained from Himawari-8, which is able to provide updated imagery on a 10 minute basis.

The project used simulations and real world experiments to determine the accuracy with which fires can be detected, their temperature and shape determined, for a range of landscapes. The project also created new techniques and protocols for the rapid attribution of fire landscapes (pre- and post-fire). These techniques seek to add quantitative vigour to existing fuel hazard estimation practices.

Read the final project report here [46], and the Fuels 3D final report here [47].

Related News

25 MAR 2021

New online - March 2021
EMERGENCY MANAGEMENT, MULTI-HAZARD

[48]

17 NOV 2020

Building capacity in northern Australian communities

INDIGENOUS COMMUNITIES, LOCAL KNOWLEDGE

[49]

16 NOV 2020

New online - November 2020

COMMUNICATION, EMERGENCY MANAGEMENT

[50]

20 OCT 2020

New online - October 2020

COMMUNICATION, EMERGENCY MANAGEMENT

[51]

21 APR 2020

New online - April 2020

COMMUNICATION, EMERGENCY MANAGEMENT

[52]

13 DEC 2019

New online – December 2019

COMMUNICATION, EMERGENCY MANAGEMENT

[53]

11 DEC 2019

Special edition Monographs share AFAC19 science

EMERGENCY MANAGEMENT, LAND MANAGEMENT

[54]

19 NOV 2019

CRC science making national impact

FIRE, FIRE SEVERITY

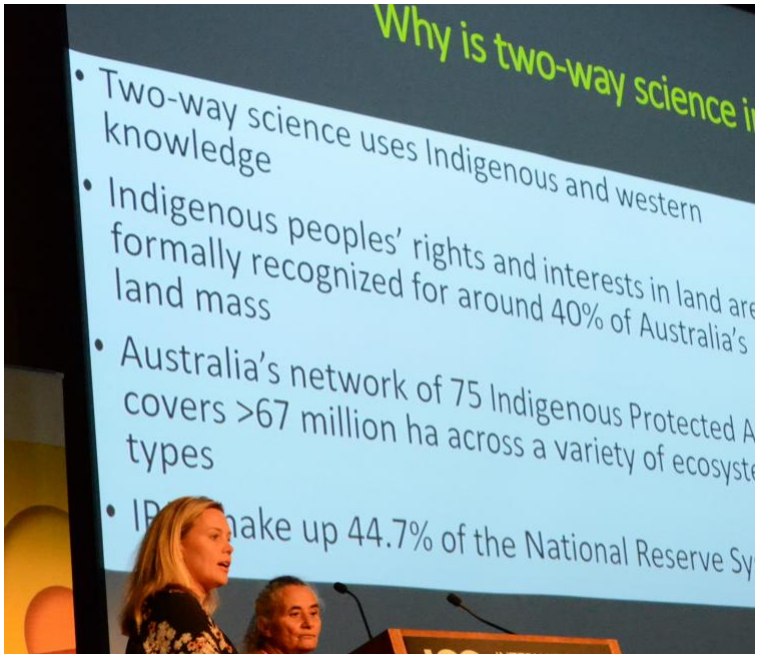
[55]

23 OCT 2019

Predictive services research spotlighted

EMERGENCY MANAGEMENT, FORECASTING

[56]



15 MAY 2019

Global fire focus on diversity, cultural burning and communities

COMMUNITIES, DIVERSITY AND INCLUSION

[57]

15 MAY 2019

Prescribed burning research warm up to conference

FORECASTING, MITIGATION

[58]

12 DEC 2018

Finding fires faster

FIRE, FIRE IMPACTS

[59]

18 SEP 2018

Conference papers available online

EMERGENCY MANAGEMENT, MULTI-HAZARD

[60]

18 DEC 2017

Finding fires faster

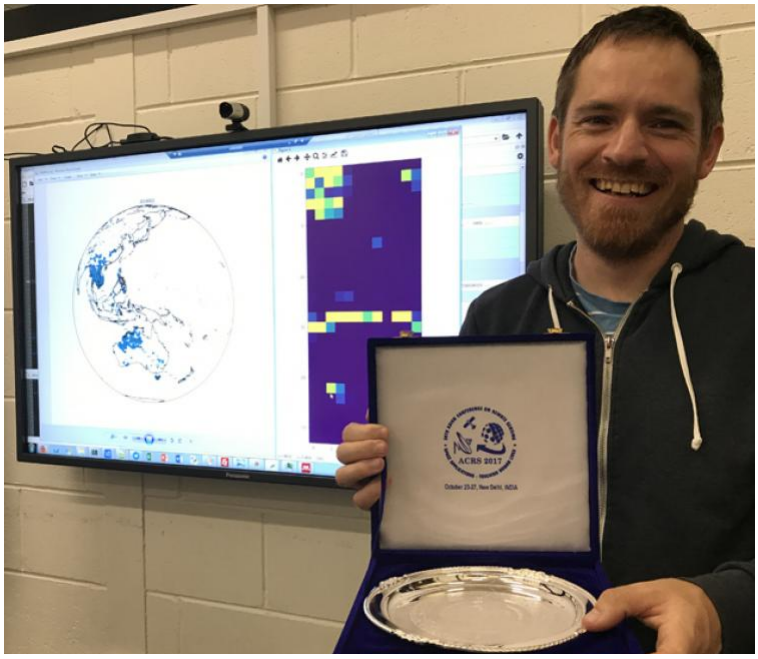
FIRE, FIRE IMPACTS

[61]

17 NOV 2017

New online - November 2017

[62]



14 NOV 2017

Awards for fire detection research

FIRE, FIRE SEVERITY

[63]

19 APR 2017

New online - April 2017

[64]

03 APR 2017

Fire mapping with satellites and smart phones

FIRE, FUEL REDUCTION

[65]

14 SEP 2016

New online - September 2016

[66]

16 AUG 2016

New online - August 2016

[67]

04 MAR 2016

Smartphones and sky scans for better fire mapping

LAND MANAGEMENT, MODELLING

[68]

29 FEB 2016

Magazine explores CRC research, case studies and technology

COMMUNITIES, LOCAL KNOWLEDGE

[69]

Publications

Year	Type	Citation
2022	Report	Jones, S. [6], Reinke, K. [8] & Engel, C. [24] **Active fire detection using the Himawari-8 satellite - final project report** [46]. (Bushfire and Natural Hazards CRC, 2022). Google Scholar [70] BibTeX [7
2022	Report	Jones, S. [6] *et al.* **Fuels3D - final project report** [47]. (Bushfire and Natural Hazards CRC, 2022). Google Scholar [73] BibTeX [74] EndNote XML [75]
2021	Journal Article	Saldias, D. San Martin [76], Reinke, K. [8], McLennan, B. [77] & Wallace, L. [22] **The influence of satellite imagery on landscape perception** [78]. *Landscape Research* (2021). doi:https://doi.org/10.1
2021	Journal Article	Hillman, S. [83], Wallace, L. [22], Reinke, K. [8] & Jones, S. [6] **A comparison between TLS and UAS LiDAR to represent eucalypt crown fuel characteristics** [84]. *ISPRS Journal of Photogrammet*
2020	Journal Article	Wallace, L. [22], Hally, B. [25], Hillman, S. [83], Jones, S. [6] & Reinke, K. [8] **Terrestrial Image-Based Point Clouds for Mapping Near-Ground Vegetation Structure: Potential and Limitations** [89]
2020	Journal Article	Engel, C. [24], Jones, S. [6] & Reinke, K. [8] **A Seasonal-Window Ensemble-Based Thresholding Technique Used to Detect Active Fires in Geostationary Remotely Sensed Data** [94]. *IEEE Trar*
2020	Journal Article	McGlade, J. [99] *et al.* **An early exploration of the use of the Microsoft Azure Kinect for estimation of urban tree Diameter at Breast Height** [100]. *Remote Sensing Letters* **11,** 963-972 (2020). DO
2020	Journal Article	Garcia-Haro, F. Javier [105] *et al.* **A global canopy water content product from AVHRR/Metop** [106]. *Remote Sensing* **162,** 77-93 (2020). DOI [107] Google Scholar [108] BibTeX [109] EndNote XML
2020	Report	Hally, B. [25], Reinke, K. [8], Wallace, L. [22] & Jones, S. [6] **Quantifying fuel hazard assessments - Fuels3D annual report 2019-2020** [111]. (Bushfire and Natural Hazards CRC, 2020). Google Scho
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2020	Report	Hally, B. [25], Reinke, K. [8], Wallace, L. [22] & Jones, S. [6] **Quantifying fuel hazard assessments - Fuels3D annual report 2018-2019** [123]. (Bushfire and Natural Hazards CRC, 2020). Google Scho
2019	Conference Paper	Reinke, K. [8], Wallace, L. [22], Hillman, S. [83], Hally, B. [25] & Jones, S. [6] **Fuels3D: barking up the wrong tree and beyond** [127]. *AFAC19 powered by INTERSCHUTZ - Bushfire and Natural Haza*
2019	Conference Paper	Engel, C. [24], Matthews, S. [26], Jones, S. [6] & Reinke, K. [8] **Detecting active fires from space using Himawari-8: a report from the regional New South Wales trial** [132]. *AFAC19 powered by I*
2019	Journal Article	Hillman, S. [83] *et al.* **A Method for Validating the Structural Completeness of Understory Vegetation Models Captured with 3D Remote Sensing** [136]. *Remote Sensing* **11,** (2019). DOI [137] Go
2019	Report	Jones, S. [6], Reinke, K. [8] & Engel, C. [24] **Active fires: Early fire detection and mapping using HIMAWARI-8 Annual Report 2017-2018** [141]. (Bushfire and Natural Hazards CRC, 2019). Google S
2018	Conference Paper	Wallace, L. [22] *et al.* **Experiences in the in-field utilisation of fuels3D** [145]. *AFAC18* (Bushfire and Natural Hazards CRC, 2018). Google Scholar [146] BibTeX [147] EndNote XML [148]
2018	Conference Paper	Engel, C. [24], Jones, S. [6] & Reinke, K. [8] **Performance of fire detection algorithms using himawari-8** [149]. *AFAC18* (Bushfire and Natural Hazards CRC, 2018). Google Scholar [150] BibTeX [15
2018	Conference Paper	Bates, J. [153] **Research proceedings from the 2018 Bushfire and Natural Hazards CRC and AFAC Conference** [154]. *Bushfire and Natural Hazards CRC & AFAC annual conference 2017* (Bushfir
2018	Journal Article	Hally, B. [25] *et al.* **Estimating Fire Background Temperature at a Geostationary Scale—An Evaluation of Contextual Methods for AHI-8** [158]. *Remote Sensing* **10,** (2018). DOI [159] Google Sch
2018	Report	Reinke, K. [8], Jones, S. [6] & Wallace, L. [22] **Fuels3D: annual project report 2017-18** [163]. (Bushfire and Natural Hazards CRC, 2018). Google Scholar [164] BibTeX [165] EndNote XML [166]
2017	Conference Paper	Rumsewicz, M. [167] **Research proceedings from the 2017 Bushfire and Natural Hazards CRC and AFAC Conference** [168]. *Bushfire and Natural Hazards CRC & AFAC annual conference 2017* (E
2017	Conference Paper	Wallace, L. [22] *et al.* **Mapping the efficacy of an Australian fuel reduction burn using Fuels3D point clouds** [172]. *AFAC17* (Bushfire and Natural Hazards CRC, 2017). Google Scholar [173] BibTe
2017	Conference Paper	Hally, B. [25], Wallace, L. [22], Reinke, K. [8], Wickramasinghe, C. [176] & Jones, S. [6] **Enhanced estimation of background temperature for fire detection using new geostationary sensors** [177]
2017	Journal Article	Spits, C. [181], Wallace, L. [22] & Reinke, K. [8] **Investigating surface and near-surface bushfire fuel attributes: a comparison between visual assessments and image-based point clouds** [182]
2017	Journal Article	Wallace, L. [22], Hillman, S. [83], Reinke, K. [8] & Hally, B. [25] **Non-destructive estimation of above-ground surface and near-surface biomass using 3D terrestrial remote sensing techniques** [
2017	Journal Article	Hally, B. [25], Wallace, L. [22], Reinke, K. [8] & Jones, S. [6] **A Broad-Area Method for the Diurnal Characterisation of Upwelling Medium Wave Infrared Radiation** [192]. *Remote Sensing* **9,** (2017
2017	Report	Jones, S. [6], Reinke, K. [8], Mitchell, S. [197], McConachie, F. [198] & Holland, C. [199] **Advances in the remote sensing of active fires: a review** [200]. (Bushfire and Natural Hazards CRC, 2017). G
2017	Report	Wallace, L. [22], Reinke, K. [8] & Jones, S. [6] **Emerging technologies for estimating fuel hazard** [204]. (Bushfire and Natural Hazards CRC, 2017). Google Scholar [205] BibTeX [206] EndNote XML
2017	Report	Jones, S. [6], Reinke, K. [8] & Wallace, L. [22] **Disaster landscape attribution: annual report 2016-17** [208]. (Bushfire and Natural Hazards CRC, 2017). Google Scholar [209] BibTeX [210] EndNote X
2016	Journal Article	Wallace, L. [22], Gupta, V. [212], Reinke, K. [8] & Jones, S. [6] **An Assessment of Pre- and Post Fire Near Surface Fuel Hazard in an Australian Dry Sclerophyll Forest Using Point Cloud Data C**
2016	Journal Article	Mitchell, S. [197], Jones, S. [6], Reinke, K. [8], Lorenz, E. [218] & Reulke, R. [219] **Assessing the utility of the TET-1 hotspot detection and characterization algorithm for determining wildfire size**
2016	Report	Jones, S. [6], Reinke, K. [8] & Wallace, L. [22] **Disaster landscape attribution: fire surveillance and hazard mapping, data scaling and validation: Annual project report** [225]. (Bushfire and Natur
2015	Journal Article	Gupta, V. [212], Reinke, K. [8], Jones, S. [6], Wallace, L. [22] & Holden, L. [229] **Assessing Metrics for Estimating Fire Induced Change in the Forest Understorey Structure Using Terrestrial Lase**
2015	Presentation	Jones, S. [6] & Reinke, K. [8] **Disaster landscape attribution, active fire detection and hazard mapping** [235]. (2015). Google Scholar [236] BibTeX [237] EndNote XML [238]
2015	Report	Jones, S. [6] **Disaster Landscape Attribution: Fire Surveillance and Hazard Mapping, Data Scaling and Validation Annual Report 2014** [239]. (2015). Google Scholar [240] BibTeX [241] EndNote
2015	Report	Jones, S. [6] & Reinke, K. [8] **Disaster landscape attribution: Annual project report 2014-2015** [243]. (Bushfire and Natural Hazards CRC, 2015). Google Scholar [244] BibTeX [245] EndNote XML [2

Presentations & Resources

DATE [247]	TITLE [248]	DOWNLOAD	KEY TOPICS
21 Mar 2014	Monitoring and prediction [249]	7.35 MB	[250] (7.35 MB), modelling [252], multi-hazard [253]
08 Sep 2014	The effect of the degree of grass curing on the behaviour of grassland fires [254]	17.65 MB	[255] (17.65 MB)
27 Oct 2014	The effect of the degree of grass curing on the behaviour of grassland fires [256]		fire [2], propagation [257]
05 Dec 2014	Thermal anomaly and hazard mapping [258]	670.97 KB	[259] (670.97 KB), severity [260]
26 Feb 2016	Fire Australia Summer 2015-16 [261]	11.81 MB	[262] (11.81 MB), [263], fire impacts [3], volunteering [264]
03 Apr 2016	Monitoring and prediction - cluster overview [265]	0 bytes	[266] (0 bytes), [260], multi-hazard [253], scenario analy
24 Oct 2016	Disaster landscape attribution, active fire detection and hazard mapping [268]	1.9 MB	[269] (1.9 MB), impacts [3], remote sensing [4]
28 Nov 2016	Monitoring and predicting natural hazards [270]	853.18 KB	[271] (853.18 KB), [260], modelling [252], severe weather [2
07 Jul 2017	Building bushfire predictive services capability - Simon Heemstra [273]	0 bytes	[274] (0 bytes), impacts [3], modelling [252]
07 Sep 2017	Enhanced estimation of background temperature for fire detection using new geostationary sensors [275]	1.11 MB	[276] (1.11 MB), fire impacts [3], remote sensing [4]
31 Oct 2017	Mapping the fire landscape: active fire surveillance and fuel hazard assessments [277]	869.85 KB	[278] (869.85 KB), impacts [3], modelling [252]
18 Sep 2018	Performance of fire detection algorithms using Himawari-8 [279]	5.93 MB	[280] (5.93 MB)
18 Sep 2018	Experiences in the in-field utilisation of Fuels3D [281]	2.49 MB	[282] (2.49 MB), severity [283], modelling [252]
23 Nov 2018	Fire surveillance and fuel [284]	2.65 MB	[285] (2.65 MB), severity [283]
27 Aug 2019	Detecting Active Fires using Himawari-8: a report from the NSW trial [286]	2.9 MB	[287] (2.9 MB), impacts [3]
27 Aug 2019	Fuels3D and the assessment of bark hazard [288]	13.38 MB	[289] (13.38 MB), impacts [3]
17 Oct 2019	Fuels3D [290]	5.15 MB	[291] (5.15 MB), impacts [3]
07 Jul 2020	AFAC webinar: Active fire detection using the Himawari-8 satellite [292]	0 bytes	[293] (0 bytes), impacts [3], remote sensing [4]
18 Nov 2020	Black Summer projects - earth observations | Northern Australia Research Engagement Forum (3/9) [294]	0 bytes	[295] (0 bytes), communities [296], local knowledge [297
25 Nov 2020	Finding fires faster [299]		fire [2], fire impacts [3], remote sensing [4]

Posters

[300]

Disaster landscape attribution: Thermal anomaly and hazard mapping

[300]

This project seeks to (1) optimize the use of earth observing systems for active fire monitoring by exploring...

[301]

Disaster Landscape Attribution: from the Ground to Space: Validation of TET-1 and HIMAWARI-8 for Active Fire Detection

[301]

FIRE [2], FIRE IMPACTS [3]

Understanding the utility of thermal remote sensing systems for active fire detection and monitoring....

[302]

Disaster Landscape Attribution: Low Cost 3D Monitoring of Fuel Hazard

[302]

FIRE [2], FIRE IMPACTS [3]

In the last decade A range of sensing technologies, techniques and platforms have emerged to capture 3D...

[303]

Disaster landscape attribution: thermal anomaly and hazard mapping

[303]

FIRE SEVERITY [283], REMOTE SENSING [4]

This project aims to attribute fire landscapes using the latest remote sensing technology.

29 JUN 2017

[304]

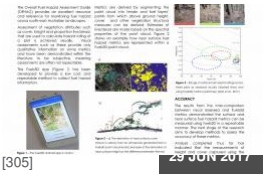
The detection and surveillance of active fire using Himawari-8

[304]

FIRE

FIRE [2], IMPACTS [3]

Himawari-8 presents exciting opportunities to map fires in near real time. Exploiting information across...



29 JUN 2017

[305]

Fuels3D: what's the point?

[305]

FIRE

FIRE [2], IMPACTS [3]

The Fuels3D app provides a low cost data collection method for estimating fuel hazard metrics. Testing of the...

19 SEP 2018

[306]

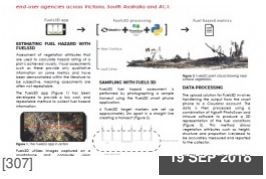
Cloudy with a chance of fire

[306]

FIRE

FIRE [2], IMPACTS [3]

Recent advances in remote sensing have led to geostationary satellite data being available over Australia ...



19 SEP 2018

[307]

Fuels3D

[307]

FIRE

FIRE [2], IMPACTS [3]

Fuels3D is a smart-phone app coupled with photogrammetry and computer vision techniques to produce 3D point...

31 AUG 2020

[308]

Fire Surveillance and hazard mapping

[308]

FIRE [2], MULTI-HAZARD [253]

Key findings: Real time wildfire detection trial using Himawari-8

Linked Projects

Improving flood forecast skill using remote sensing data [309]

FLOOD AND COASTAL MANAGEMENT [310]

A/Prof Valentijn Pauwels
Monash University [311]

MONASH University

[311]

Fire surveillance and hazard mapping [5]

BUSHFIRE PREDICTIVE SERVICES [312]

Prof Simon Jones
RMIT University [7]

RMIT UNIVERSITY

[7]

Fire spread prediction across fuel types [313]

BUSHFIRE PREDICTIVE SERVICES [312]

A/Prof Khalid Moinuddin
Victoria University [314]

[314]

Mapping bushfire hazard and impacts [315]

BUSHFIRE PREDICTIVE SERVICES [312]

A/Prof Marta Yebra
Australian National University [316]

[316]

http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Fuels3D%3A%2Bannual%2Bproject%2Breport%2B2017-18%22&as_sauthors=Reinke&as_occt=any&as_epq=&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sdtAAP=1&as_sdtp=1 [165] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/5091 [166] https://www.bnhcrc.com.au/publications/biblio/export/xml/5091 [167] https://www.bnhcrc.com.au/people/michael-rumsewicz [168] https://www.bnhcrc.com.au/publications/researchproceedings2017 [169] http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Research%2Bproceedings%2Bfrom%2Bthe%2B2017%2BBushfire%2Band%2BNatural%2BHazards%2BCRC%2Band%2BAFAC%2BConference%22&as_sauthors=Rumsewicz& [170] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/3946 [171] https://www.bnhcrc.com.au/publications/biblio/export/xml/3946 [172] https://www.bnhcrc.com.au/publications/biblio/bnh-3913 [173] 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