

Supplemental Material

Table S1. Confusion Matrix. The multiclass confusion matrix for the best model (gradient boosting, multiclass, difference imagery) on the test data set.

Prediction	Reference								
		Retardant	Burned	Unburned	Cloud post-application	Cloud pre-application	Shadow post-application	Shadow pre-application	All
	Retardant	15575	0	20	0	2	0	0	15597
	Burned	1552	40121	305	465	1362	6155	27	49987
	Unburned	7887	42	110458	749	817	0	167	120120
	Cloud post-application	1	0	4	11443	0	0	1512	12960
	Cloud pre-application	0	0	2	0	6552	2619	0	9173
	Shadow post-application	312	0	0	0	2514	4322	0	7148
	Shadow pre-application	0	0	0	418	0	0	10058	10476
	All	25327	40163	110789	13075	11247	13096	11764	225461

Performance of best model (gradient boosting, multiclass, difference imagery) with RGB (2,3,4) bands only.

Train Overall Accuracy: 0.680

Test Overall Accuracy: 0.802

Test Retardant Precision: 0.983

Test Retardant Recall: 0.479

Test Retardant F1 Score: 0.644

Table S2. Model Feature Importances. Model feature importances on a Random Forest single-class difference image classification.

Band (Name)	2 (Blue)	3 (Green)	4 (Red)	5 (Red-edge)	8 (NIR)	11 (SWIR1)	12 (SWIR2)
Importance	0.108	0.162	0.201	0.114	0.108	0.084	0.223

Table S3. Scene ID. Sentinel-2 scenes used for model development and testing.

Fire	Date	Scene(s) ID
Apple	20200727	S2A_MSIL1C_20200727T182921_N0209_R027_T11SNT_20200727T221829.zip
Apple	20200808	S2A_MSIL1C_20200803T181931_N0209_R127_T11SNT_20200803T220613.zip
Blue River	20200529	S2A_MSIL1C_20200529T175921_N0209_R041_T12SWC_20200529T213918.zip
Blue River	20200608	S2A_MSIL1C_20200608T175921_N0209_R041_T12SWC_20200608T213845.zip
Bobcat	20200801	S2B_MSIL1C_20200801T182919_N0209_R027_T11SMT_20200801T220312.zip
Bobcat	20200920	S2B_MSIL1C_20200920T182949_N0209_R027_T11SMT_20200920T215931.zip
Mammoth	20210601	S2B_MSIL1C_20210601T180919_N0300_R084_T12SUG_20210601T213552.zip
Mammoth	20210611	S2B_MSIL1C_20210611T180919_N0300_R084_T12SUG_20210611T213307.zip
Mescal	20210603	S2A_MSIL1C_20210603T175911_N0300_R041_T12SVB_20210603T214958.zip, S2A_MSIL1C_20210603T175911_N0300_R041_T12SWB_20210603T214958.zip
Mescal	20210613	S2A_MSIL1C_20210613T175911_N0300_R041_T12SVB_20210613T215000.zip, S2A_MSIL1C_20210613T175911_N0300_R041_T12SWB_20210613T215000.zip
Telegraph	20210603	S2A_MSIL1C_20210603T175911_N0300_R041_T12SVB_20210603T214958.zip, S2A_MSIL1C_20210603T175911_N0300_R041_T12SWB_20210603T214958.zip
Telegraph	20210613	S2A_MSIL1C_20210613T175911_N0300_R041_T12SVB_20210613T215000.zip, S2A_MSIL1C_20210613T175911_N0300_R041_T12SWB_20210613T215000.zip
Willow	20200613	S2B_MSIL1C_20210613T184919_N0300_R113_T10SFF_20210613T205904.zip
Willow	20200623	S2B_MSIL1C_20210623T184919_N0300_R113_T10SFF_20210623T222031.zip

The scripts are stand-alone and should be run Script S1 then Script S2. To reproduce results, download the data listed in Table S3, ensure files are organized according to the script headers, and update user-defined values. The reference labels used in the study are located within the ‘input’ folder of the supplemental material.

Script S1. Model Training and Testing. Stand-alone script that trains a machine learning model to classify wildfire retardant from Sentinel-2 imagery, see “s1/model_training_testing.py”.

Script S2. Model Prediction. Stand-alone script that applies a machine learning model to classify wildfire retardant from Sentinel-2 imagery, see “s1/model_prediction.py”.