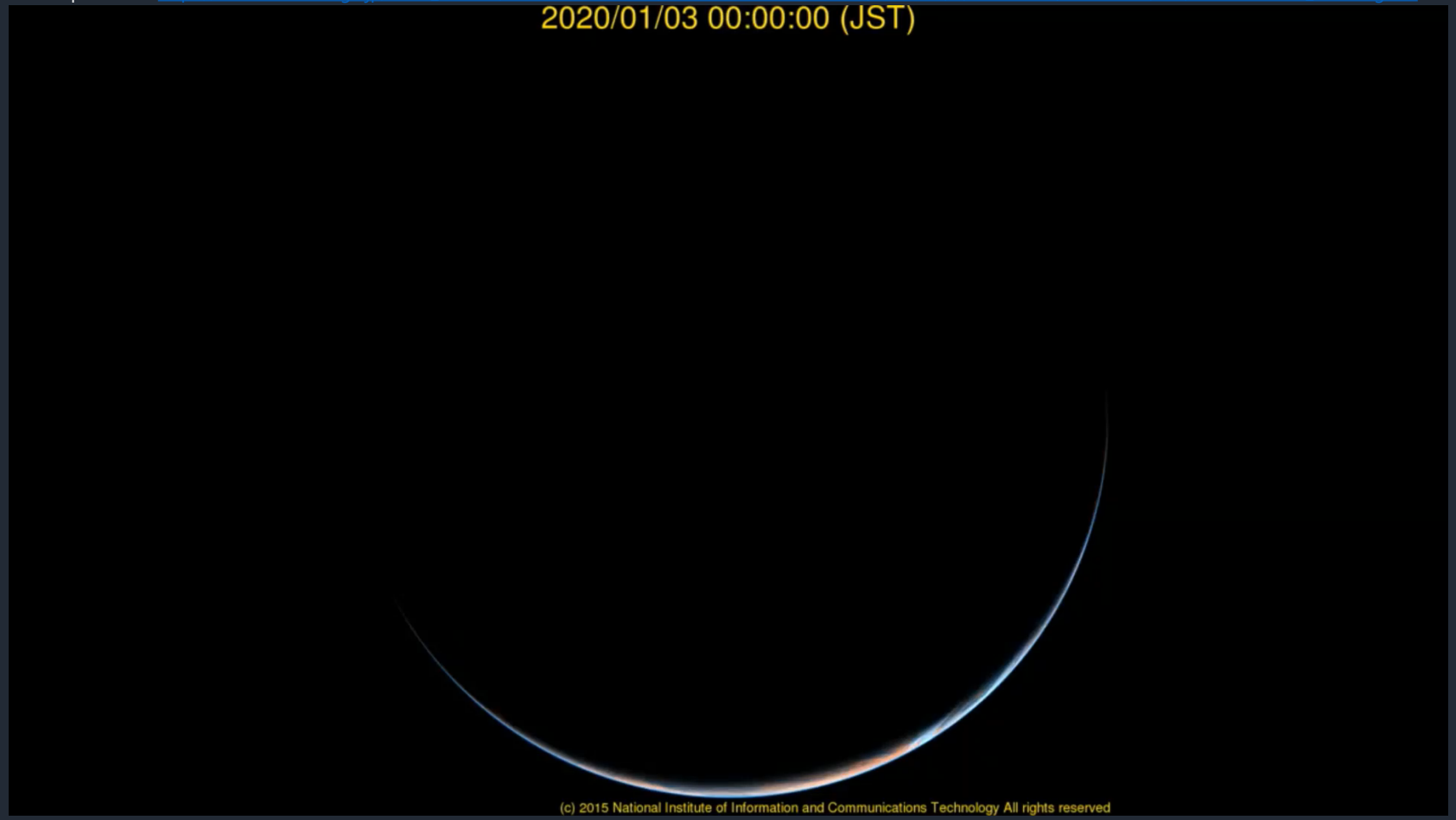
Introduction

Adapted from https://sc-nc-web.nict.go.jp/wsdb_osndisk/shareDirDownload/bDw2maKV?sl=D531106,D531107,TI,D531106m,D531107m,TIm,evm&slt=data_im&lang=en

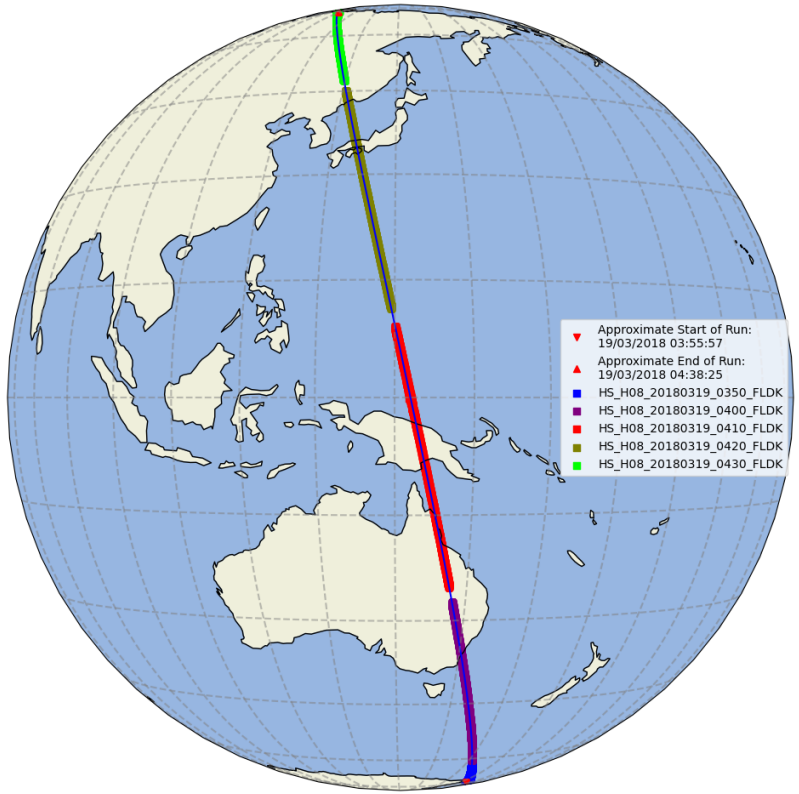


Collocation

A dataset to train a cloud and aerosol identification NN was created by collocating CALIOP 5km merged cloud and aerosol products [1] with Himawari-8 full-disk scenes [2].

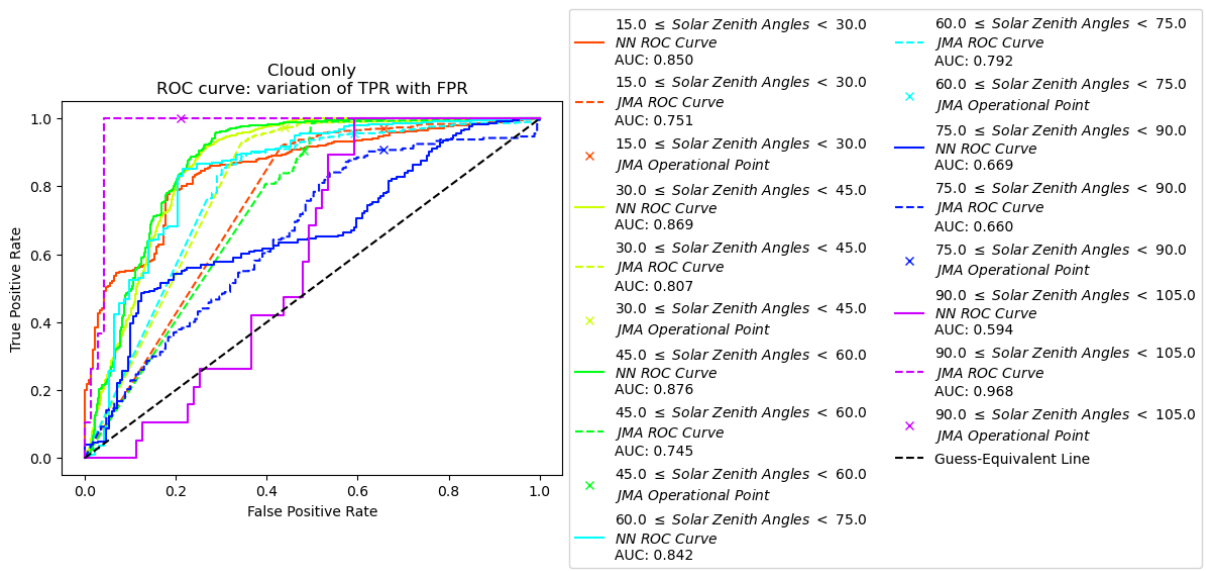
All Himawari-8 data was downsampled to 2km resolution. Each CALIOP object was parallax corrected and the vertical feature information stored with the collocated Himawari-8 pixel information.

3448 CALIOP overpasses (from 01/11/2017 to 01/01/2019) have been collocated with Himawari-8 so far.

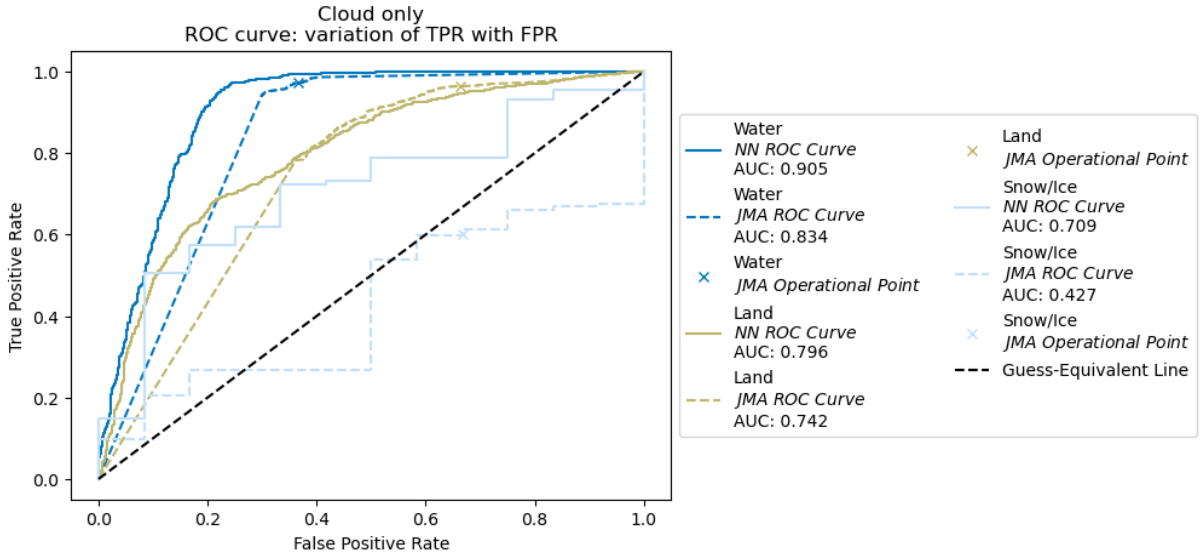


An example collocation between CALIOP and Himawari-8

NN vs JMA Cloud Identification

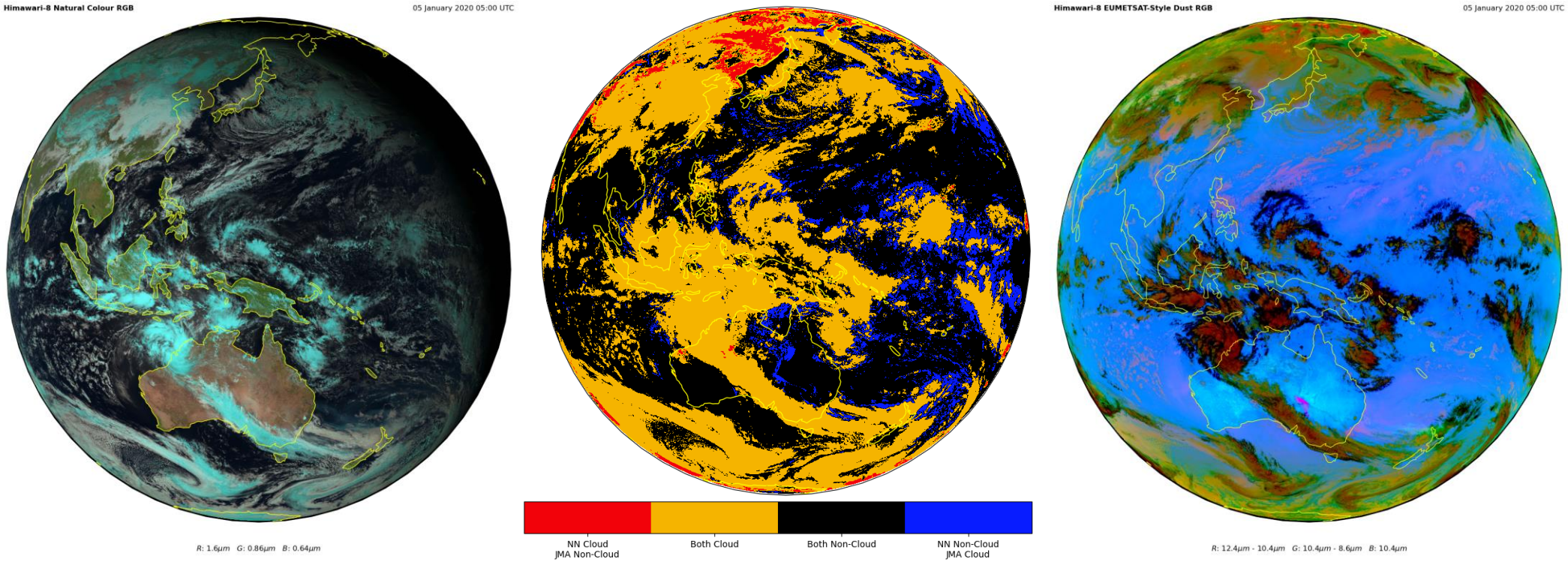


The NN appears to be less conservative at classifying pixels as clear than the JMA cloud mask in daylight conditions, but struggles to accurately identify cloud in twilight and night conditions.



The NN performs better over all surface types versus the JMA cloud mask, with a significant improvement over snow and ice due to the NN's accuracy over the poles.

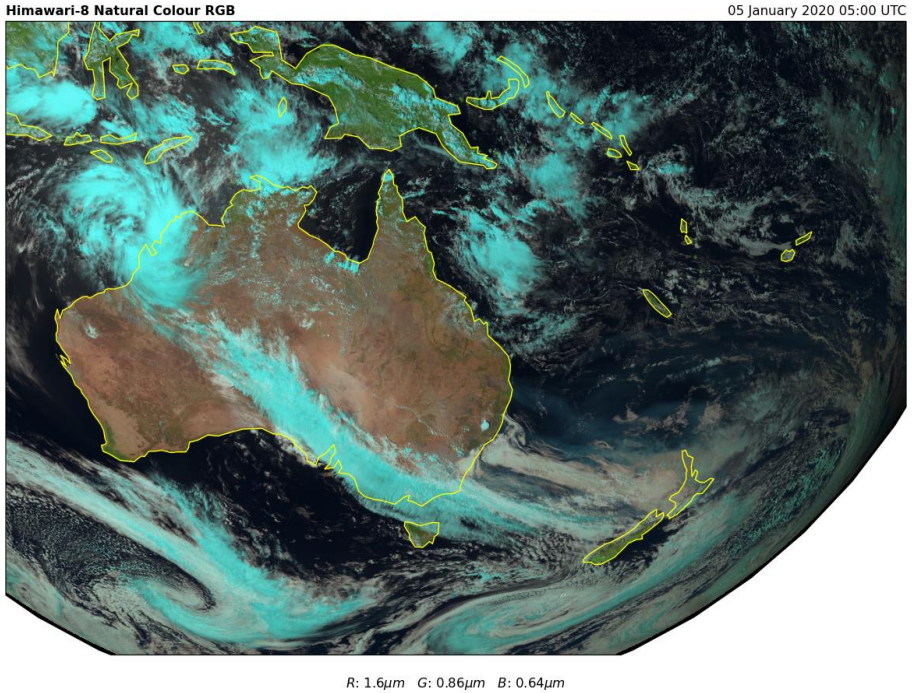
NN vs JMA Cloud Identification

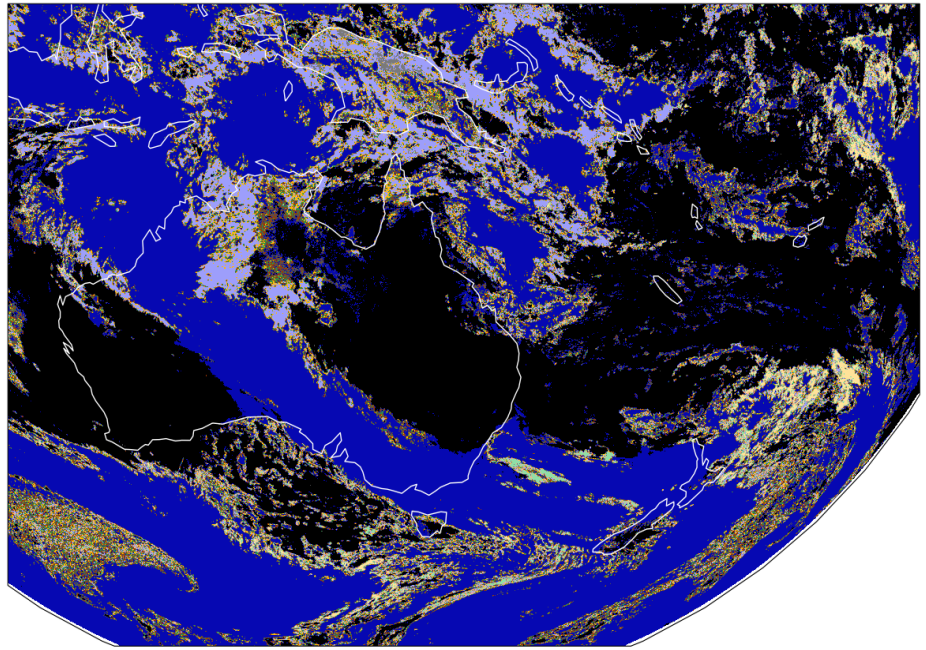


Comparative mask for the NN vs JMA cloud classifications

The NN can accurately identify clouds over the poles and doesn't classify dust and thin smoke as cloud. However, it fails to fully capture thin clouds and cloud edges in twilight and night conditions.

Full Classification of Example Scene over Australia





Full classification of a scene over Australia during the 2019-20 bushfire season, with large amounts of smoke off of the coast of NSW.