

A satellite image of the Southern Ocean showing clouds and landmasses. A white rounded rectangular box covers the central text area.

# CloudS2Mask

Sentinel-2 cloud and shadow masking

Nick Wright

# Sentinel-2

Launch date 2015

Resolution 10m

5 day revisit

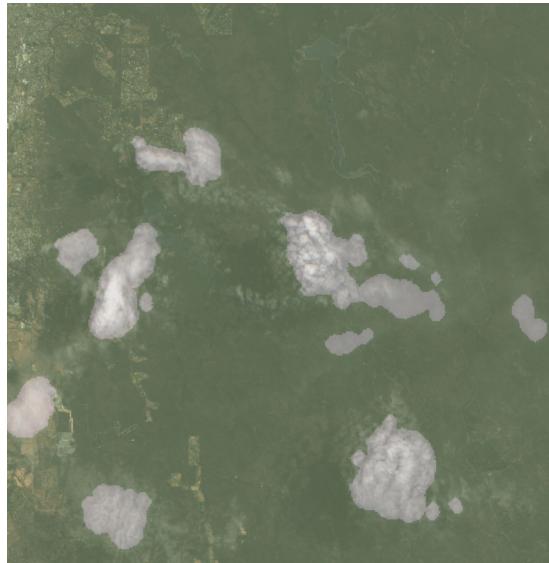


# The Problem

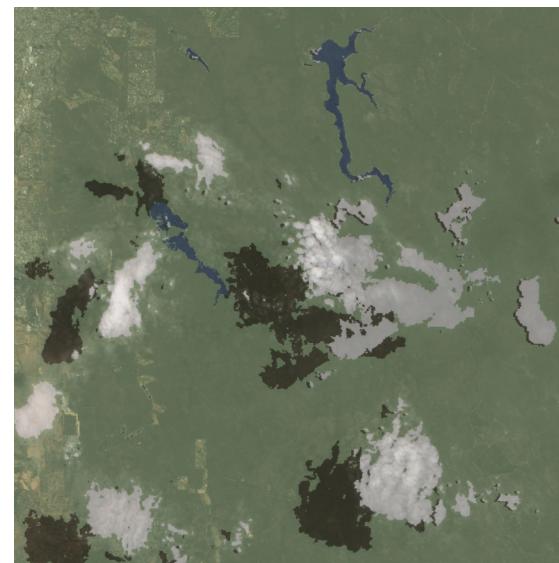


<https://maps.dea.ga.gov.au/>

Sentinel 2 RGB



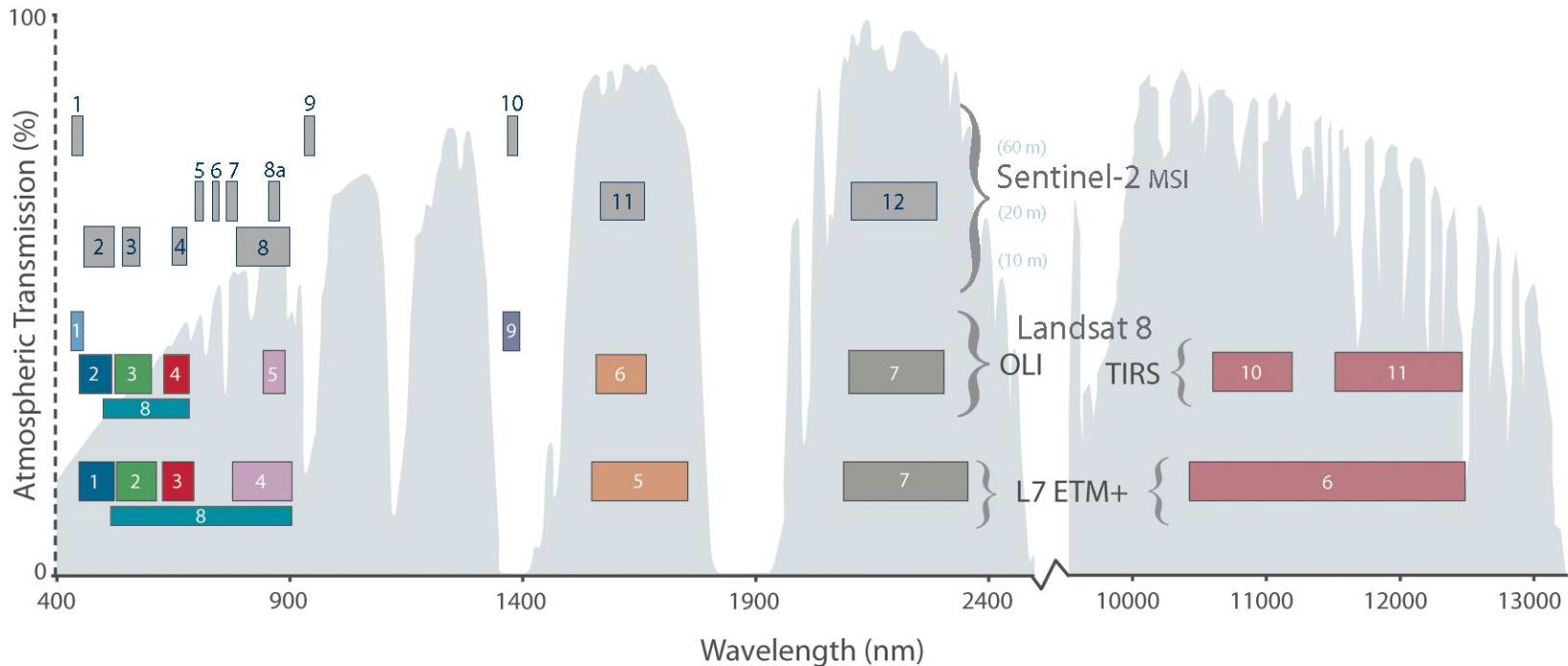
s2cloudless



Fmask

# The Reason

Comparison of Landsat 7 and 8 bands with Sentinel-2

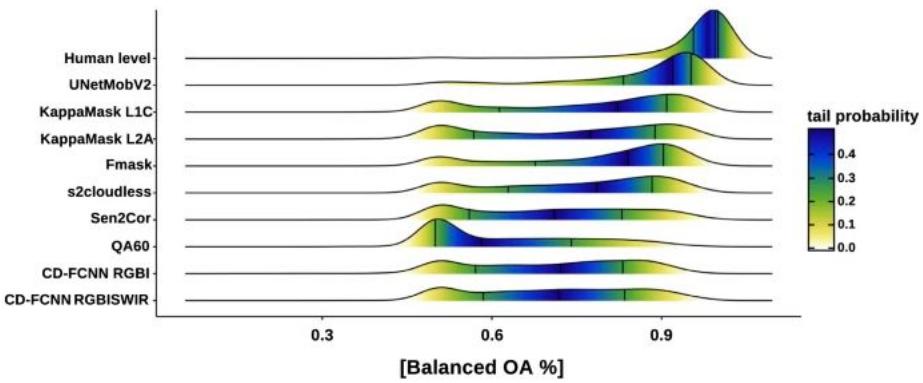
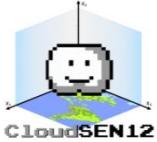


# The Solution?

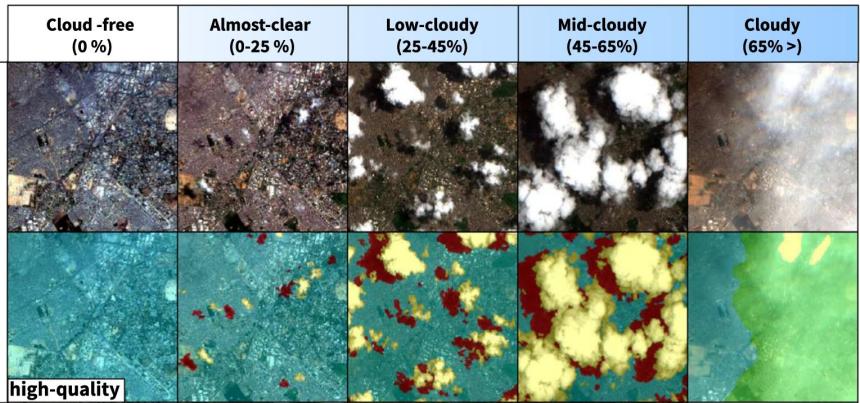
## KappaSet -> KappaMask



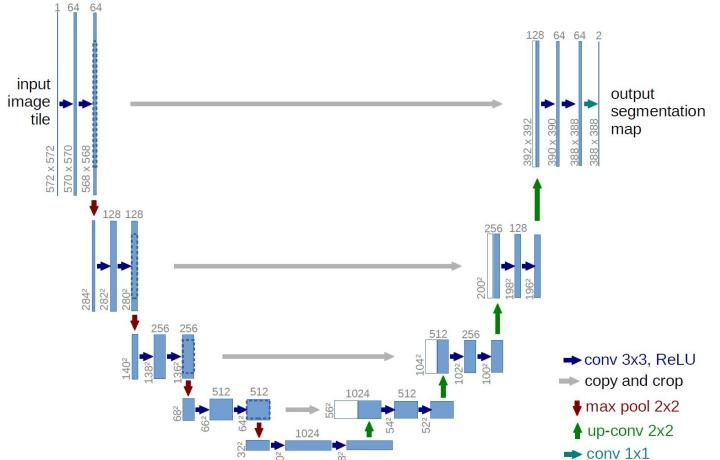
## CloudSEN12 -> UnetMobv2



<https://www.nature.com/articles/s41597-022-01878-2>



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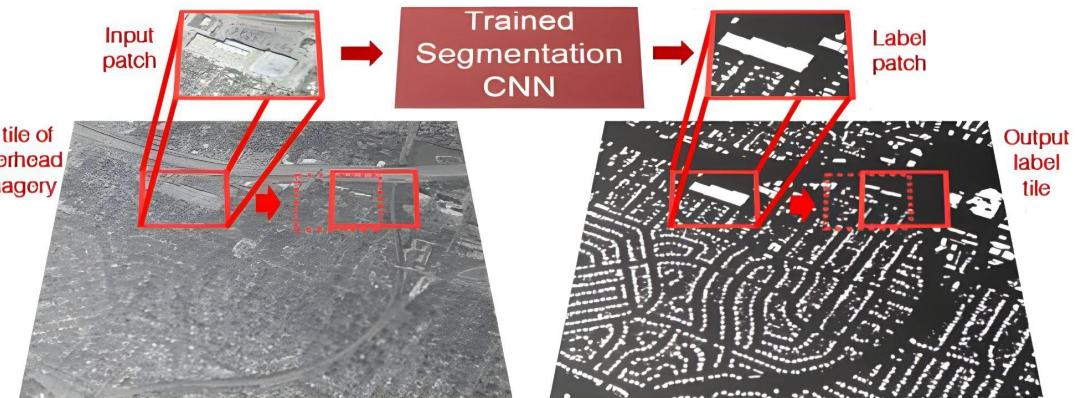
<https://arxiv.org/pdf/1505.04597.pdf>

# More Problems

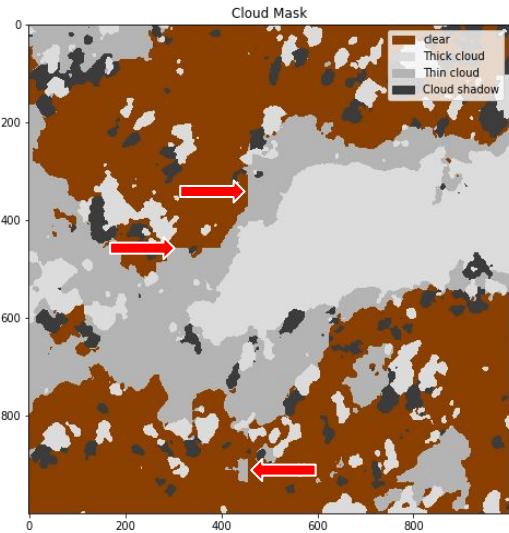
GPU RAM / patches

13x10980x10980

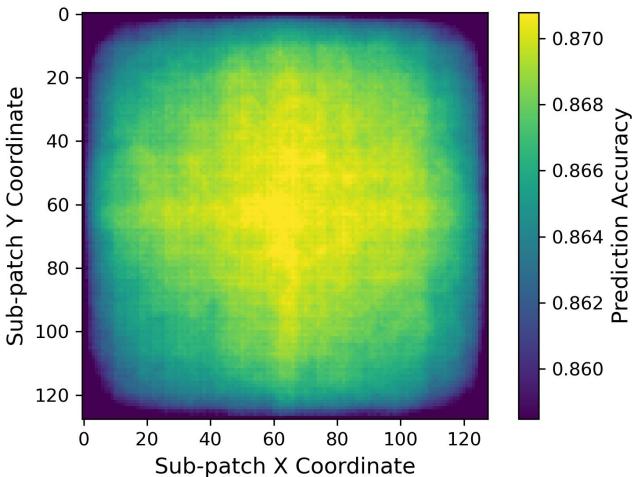
Computations efficiency



<https://arxiv.org/pdf/1805.12219.pdf>

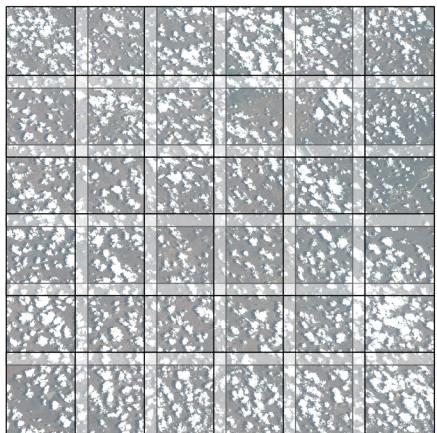


<https://cloudsen12.github.io/>

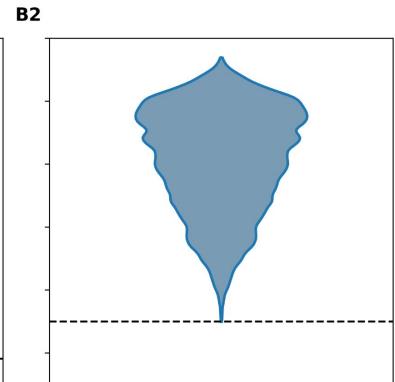
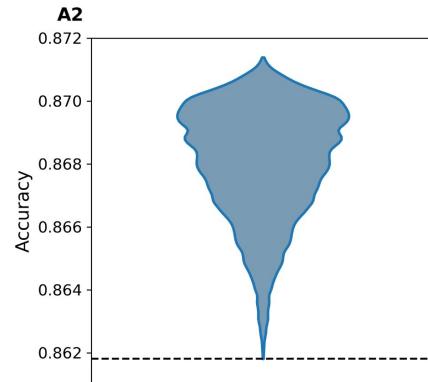
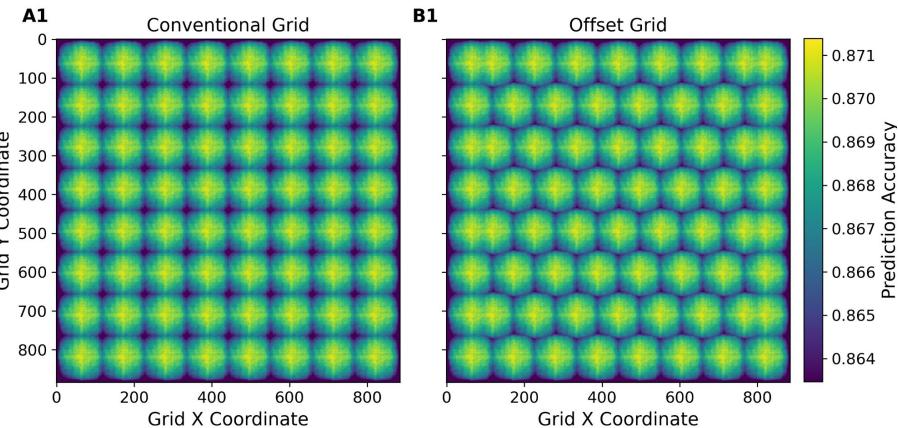
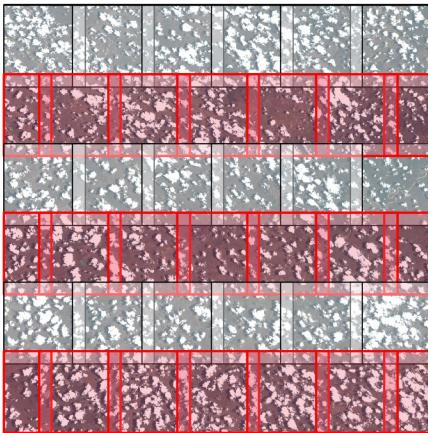


# Patch Optimisations

Conventional Grid Approach

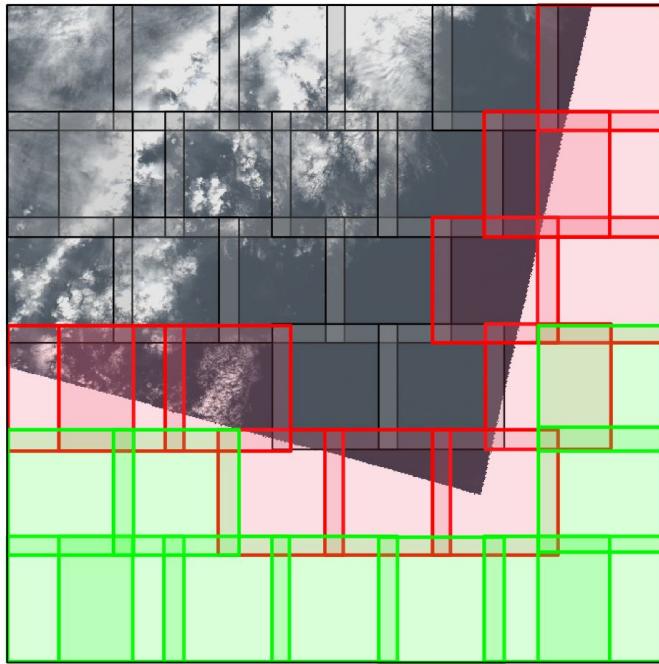


Offset Grid Approach

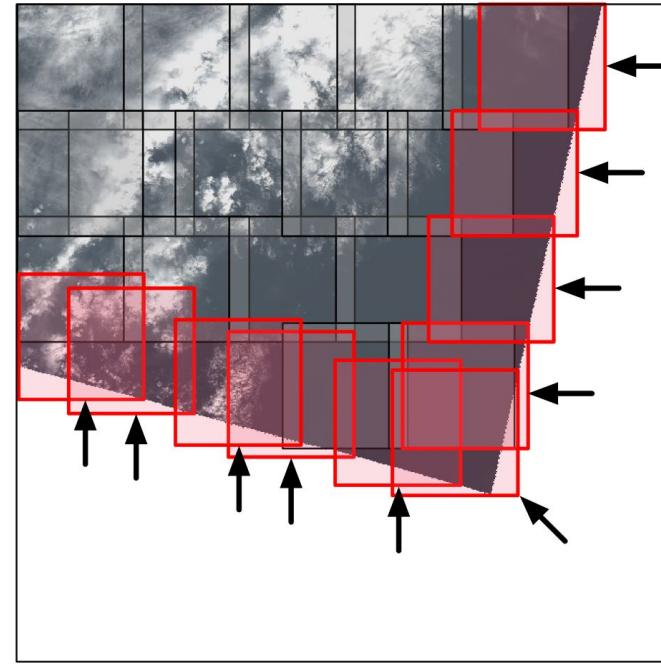


# Patch Optimisations

Unoptimised Patches



Optimised Patches

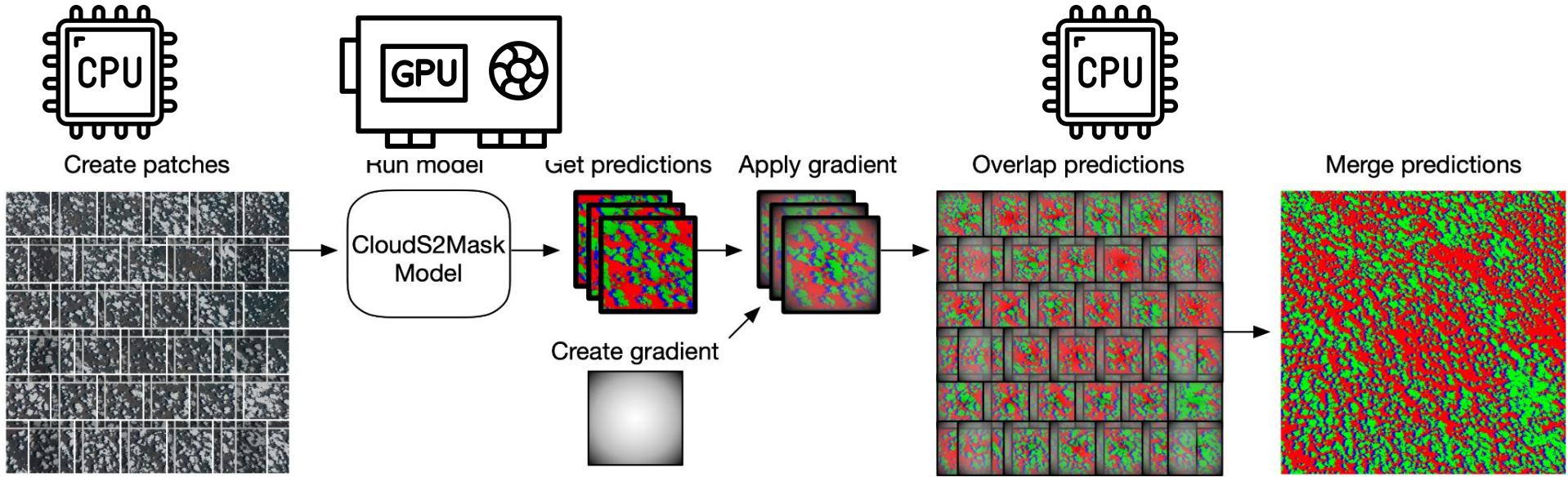


# Inference Pipeline

10m and 20m

Async patch creations and merging

2 seconds



# Usage

<https://github.com/DPIRD-DMA/CloudS2Mask>

pip install clouds2mask

```
from pathlib import Path
from clouds2mask import (
    create_settings,
    batch_process_scenes,
)

output_dir = Path("./outputs")
l1c_folders_path = Path("/path/to/your/S2_l1c_SAFE/folders")
l1c_folders = list(l1c_folders_path.glob("*.SAFE"))

scene_settings = create_settings(
    sent_safe_dirs=l1c_folders,
    output_dir=output_dir,
    processing_res=20,
)

paths_to_masks = batch_process_scenes(scene_settings)
```

# Funding

Australian Government's Research Training Program

Department of Primary Industries and Regional Development

Australian Government Department of Agriculture Fisheries and Forestry Future Drought Fund

