Trainforest
Predicting Amazon Deforestation with Satellite Images

Background
- ❏ Forests on Earth rapidly shrinking due to human urbanization
- ❏ Deforestation in the Amazon Basin particularly noticeable, leading to reduced biodiversity, climate change, and habitat loss

Problem
- ❏ Given satellite image, predict one of four atmospheric labels and zero or more of thirteen land cover/land use phenomena labels
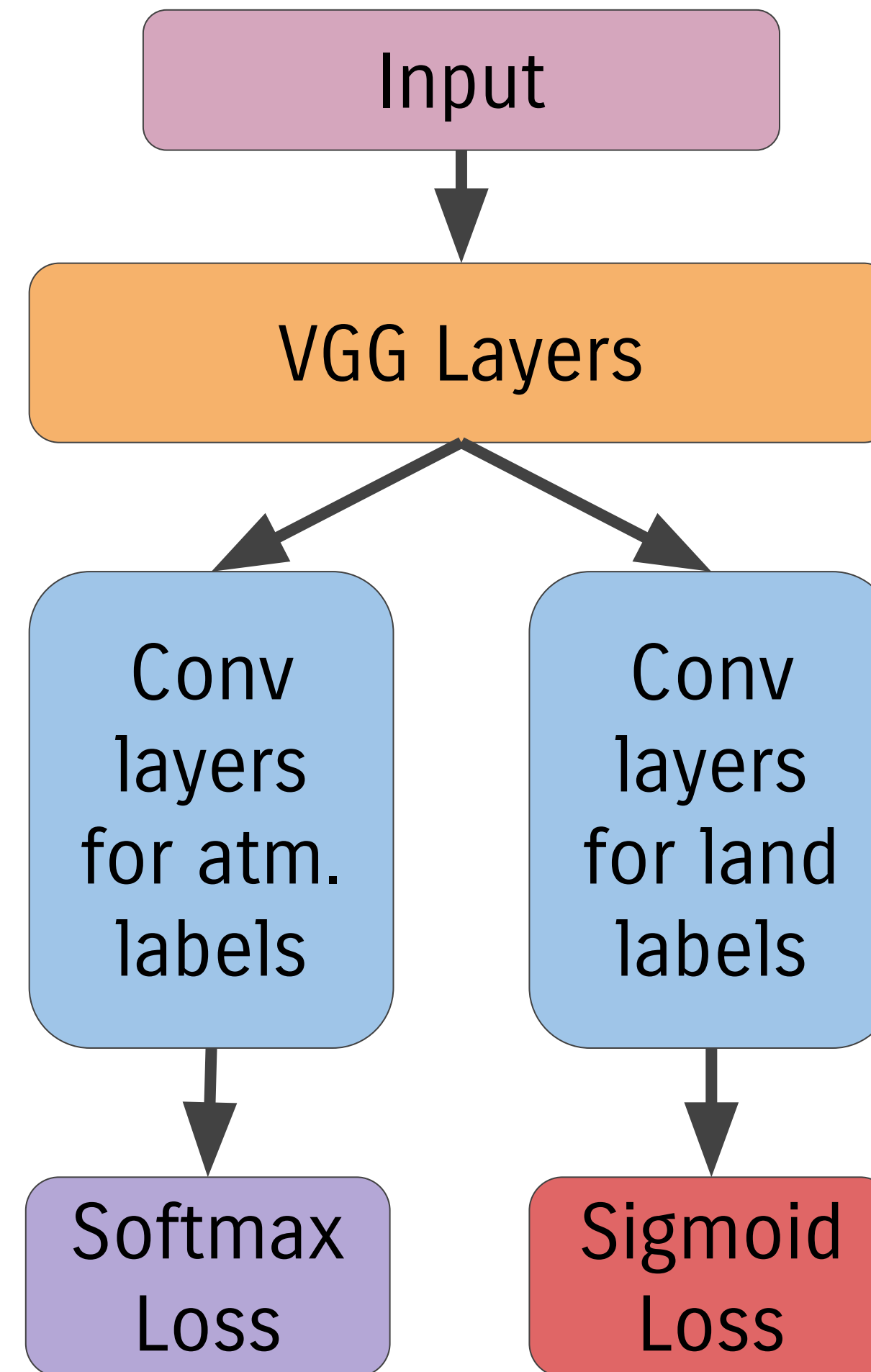- ❏ Multi-classification model evaluated by mean F2 score

Dataset
- ❏ 40479 labeled 256x256 JPEG images of the forest scenes from the Amazon basin from Planet
- ❏ 34000 images used for training, remaining for validation
- ❏ Predicted test set of over 60000 images and submitted to Kaggle

Architectures and Results
- ❏ CNN baseline   Dev F2: 0.878   Test F2: 0.876
- ❏ VGG-16   Dev F2: 0.904   Test F2: 0.903
- ❏ Split Classifier Dev F2: 0.885   Test F2: 0.885
- ❏ SqueezeNet   Dev F2: 0.891   Test F2: 0.885

Split Classifier

Input → VGG Layers → (Conv layers for atm. labels → Softmax Loss) / (Conv layers for land labels → Sigmoid Loss)

Conclusion
- ❏ VGG produces the best results
- ❏ Making separate classifiers may be suboptimal because the labels may correlate with each other
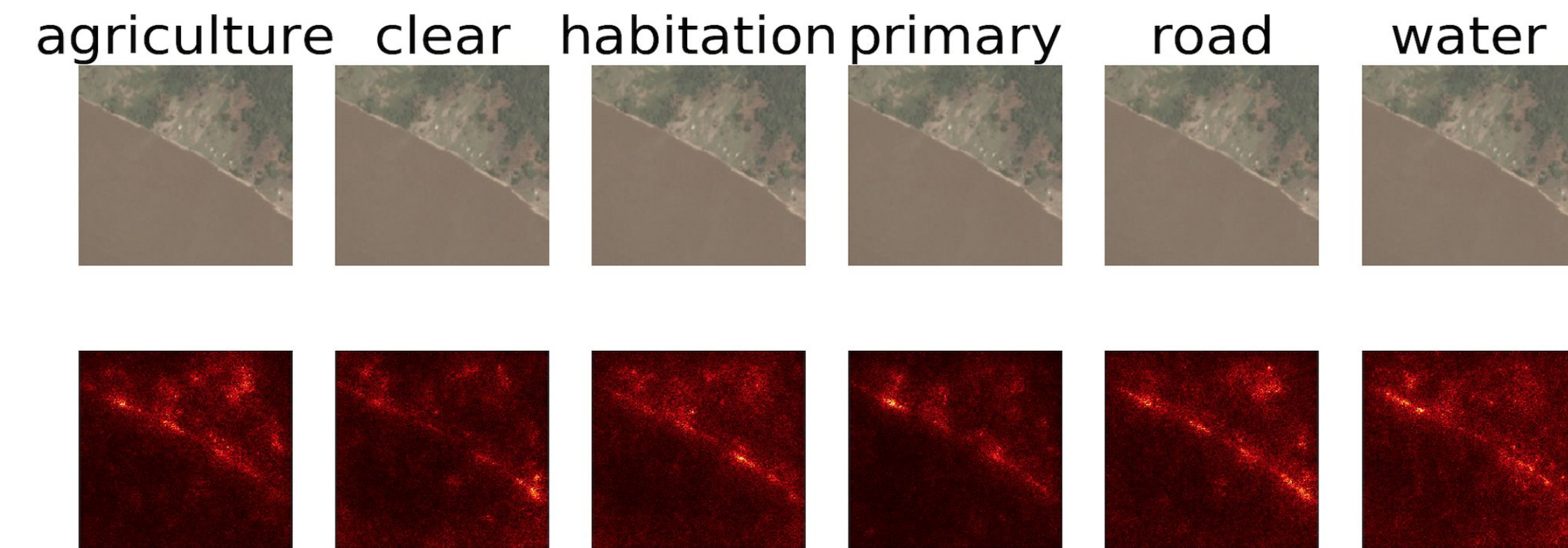- ❏ *Next steps*: Experiment with other loss functions and model hierarchies

Saliency Maps

agriculture   clear   habitation   primary   road   water

Figure 1. Saliency maps of each label for one image

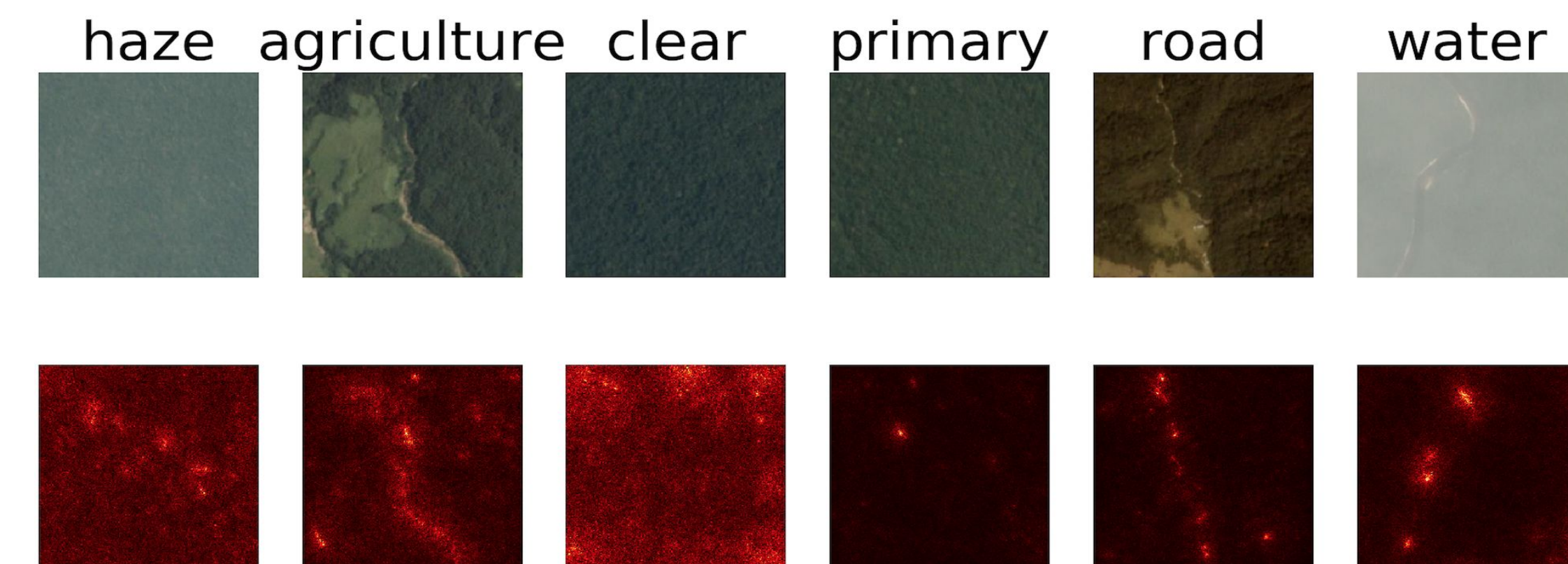haze   agriculture   clear   primary   road   water

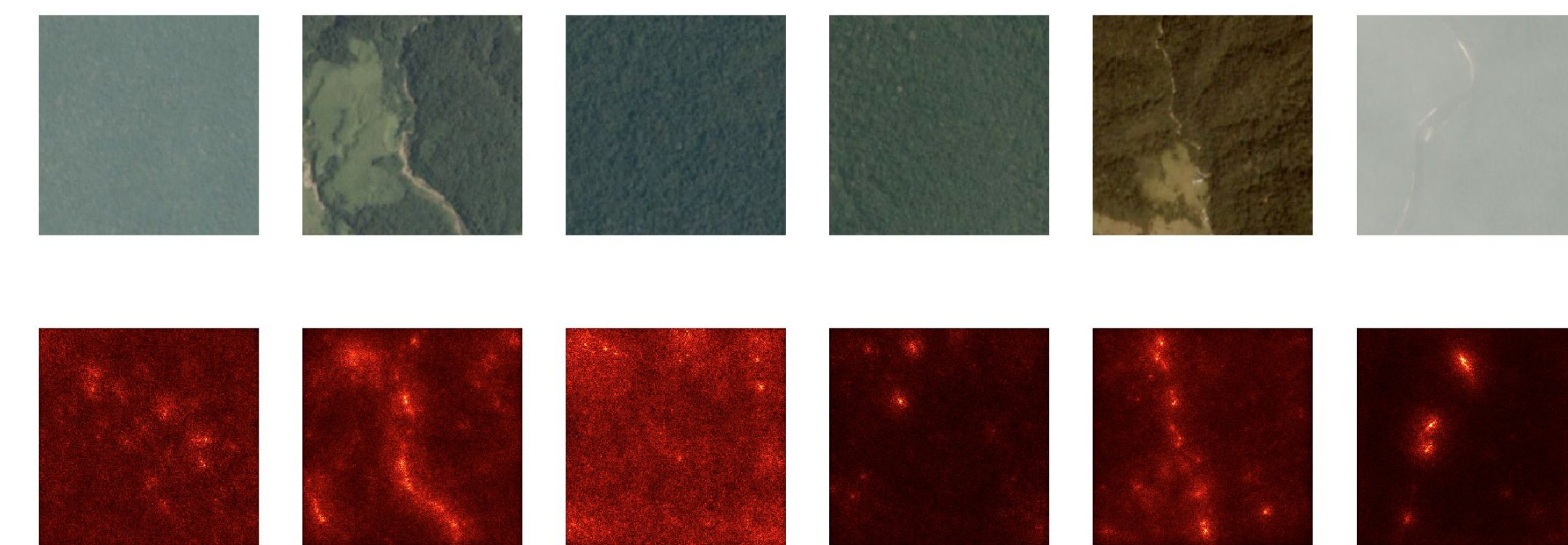
Figure 2. Saliency maps of different labels for assorted images

Figure 3. Sum of saliency maps of all correct labels for images

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