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Appendix A – Simulation Environment

There are three main pieces of information critical to the process. First, the satellite survey from which key points are selected. The satellite image is approximated in simulation by a 2D map, where each point is **s** dimensional vector of intensities at each wavelength. Note, the satellite image can see **s** wavelengths. Second, the data acquired by the rover upon using its more expensive and higher resolution spectrometer. This data is approximated by another 2D map, in which each point holds an **n** dimensional vector. Note, since the rover's spectrometer is high resolution, **n > s.** When the rover samples, the sample is pulled from the second map. In simulation both maps are provided to the rover, the first to plan in, and the second to pull samples from. Lastly, a true classification is also gleamed from the simulator, which isn't used by the rover. We can choose the number of distinct rock classes present in the image and also a number of dominant and rare classes. Figure 1, shows the three maps. In this figure, only the first 3 channels of the second map are shown as an image. Observed values map is the satellite map, while the true values map is the second sample map.
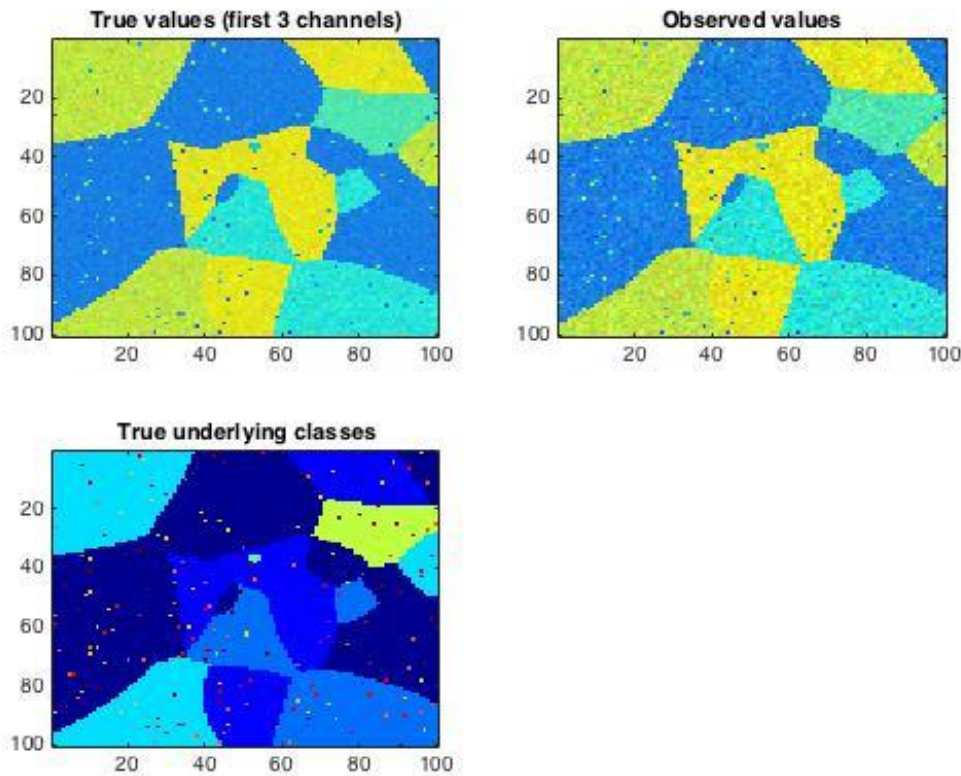

Figure 1 Simulation Maps (s = 3, n = 8, dominant classes = 8, rare classes = 2, total classes = 10)

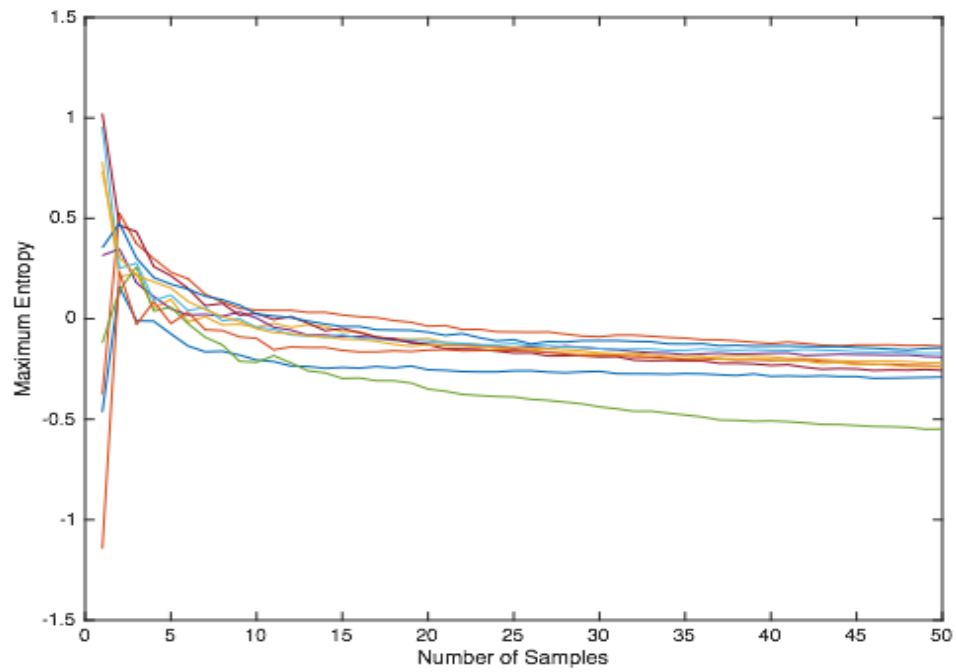# Appendix B - Differential Entropy - Greedy Approach

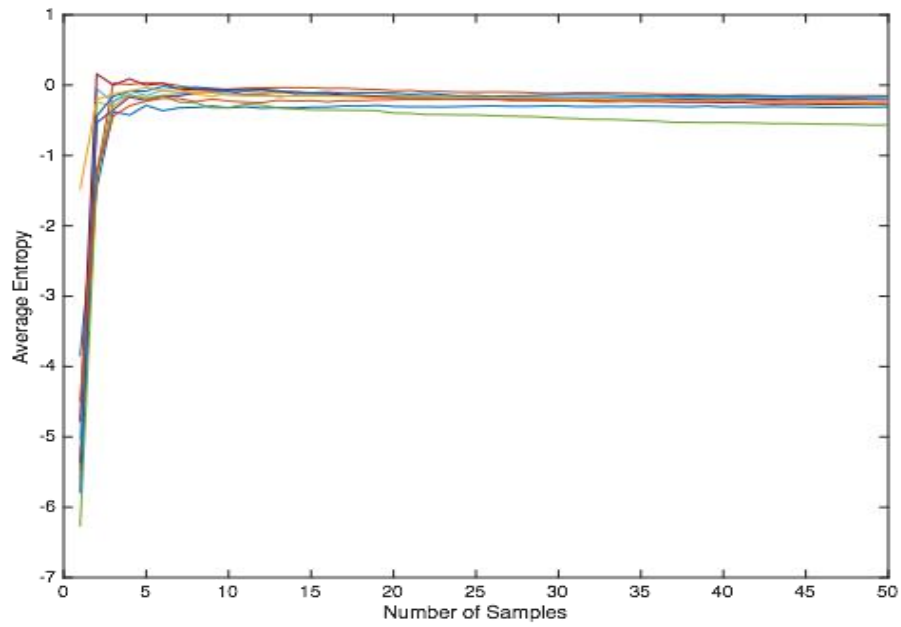Figure 1 Reduction in Maximum Entropy after 50 samples

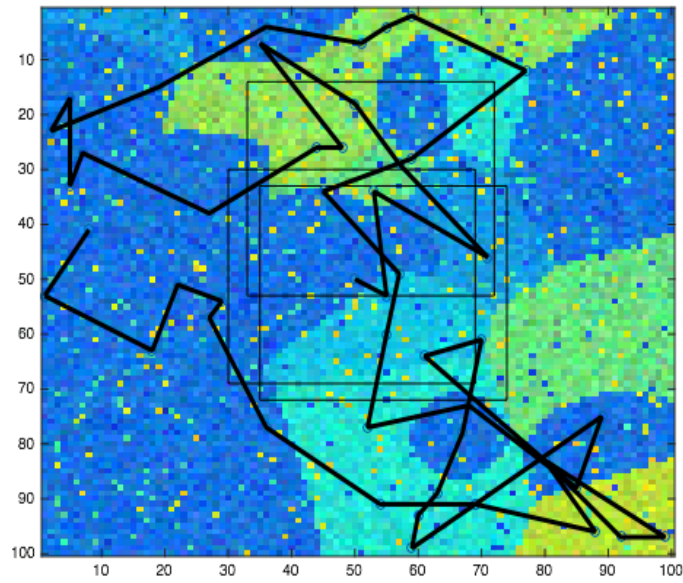Figure 2 Reduction in Average Entropy of the map after 50 samples

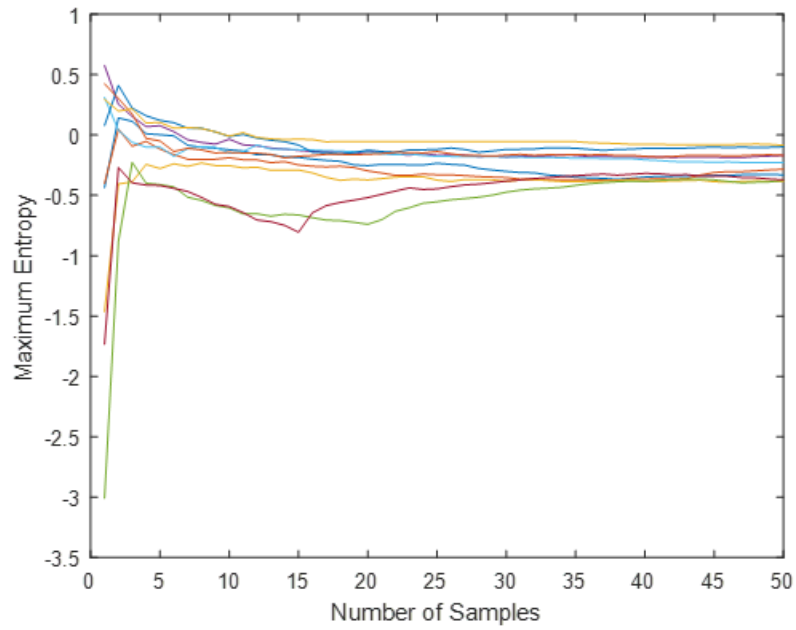**Figure 3 Paths obtained with window size of +-20**

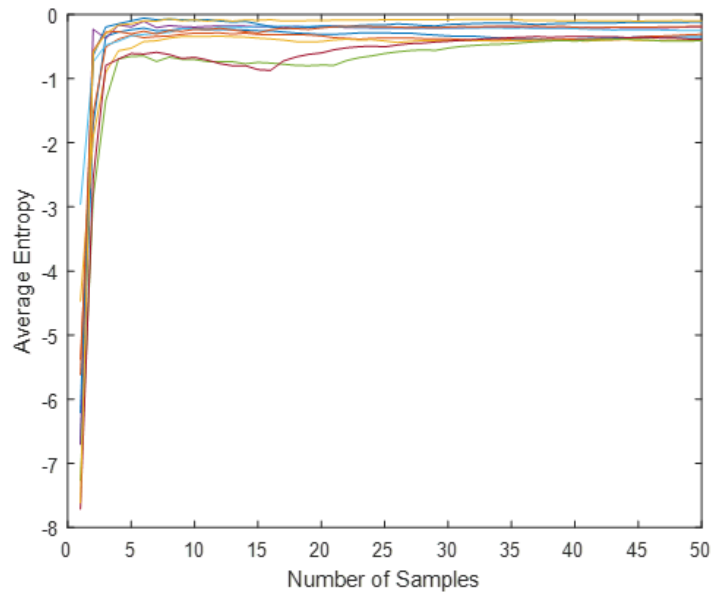**Figure 4 Change in maximum entropy for window size of +-20**

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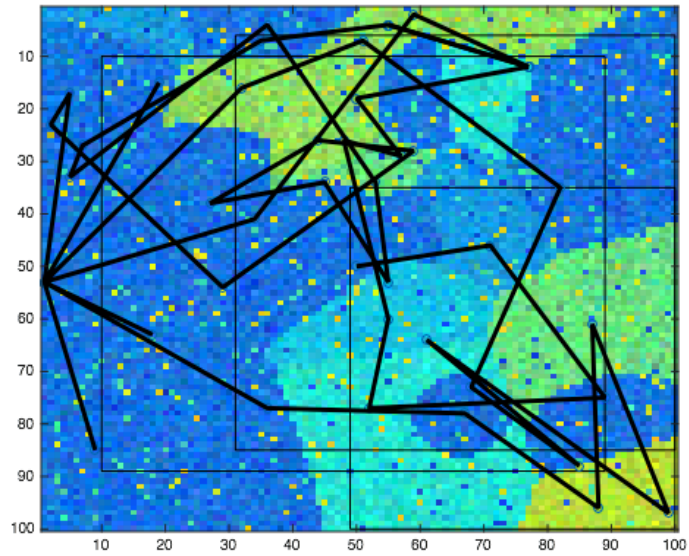Figure 5 Change in average entropy for window size of +-20

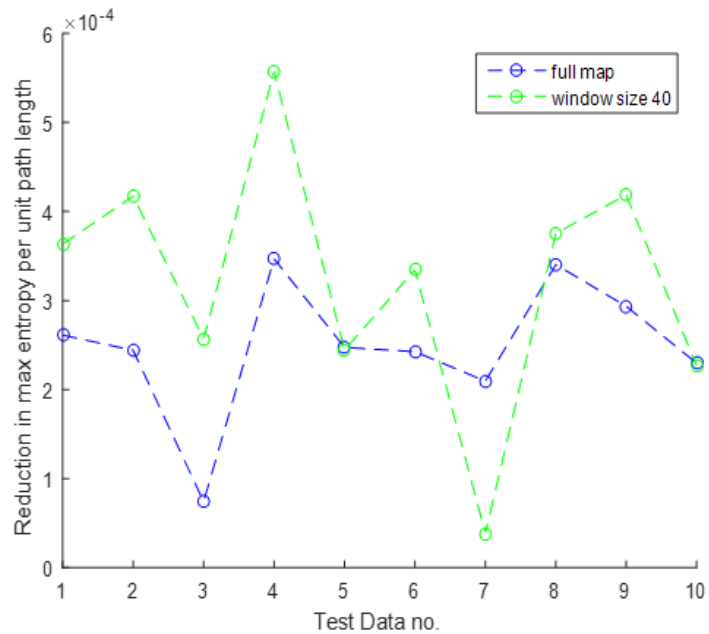Figure 6 Paths obtained with window size of +-40
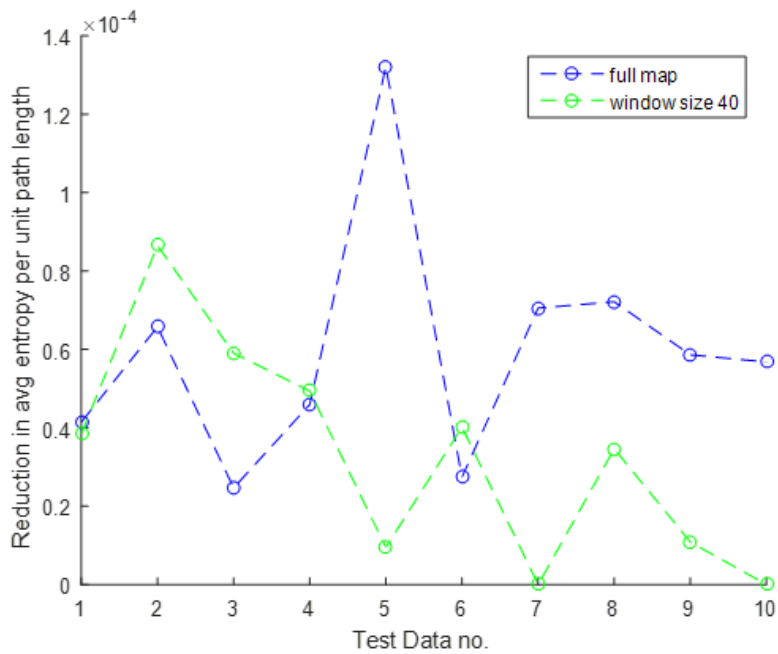
Figure 7 Reduction in Maximum Entropy per unit path length

Figure 8 Reduction in Average Entropy per unit path length