# Methane plumes detection on hyperspectral images with a variant of Generalized Likelihood Ratio Tests

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**Résumé**

Reducing methane emissions is essential to tackle climate change. In a time lapse of 20 years, a methane (CH4) molecule has a global warming potential 80 times larger than carbon dioxide (CO2). Here, we address the problem of detecting automatically point source methane leaks using high resolution hyperspectral images from the PRISMA satellite. Several methods for the detection of point source methane emissions on PRISMA already exist. A very popular approach for this task is the matched filter (MF) technique. Here we propose an improvement of the matched filter by using a variation of generalized likelihood ratio tests (GLRT). We introduce this new method under the name: Model Adjusted GLRT (MA-GLRT). Our method improves GLRT methods by adding an adjustment coefficient. The adjustment coefficient aims at reducing the number of false positives compared to what can be observed with the matched filter or the standard GLRT. To validate the method, we evaluate our approach on manually-annotated plumes detected in PRISMA satellite images. We also compare our results to the matched filter. The results show that based on a comparison of the F1 score our method outperforms the GLRT and the matched filter.

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