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Further Evidences of Volcanic Plume Detection by means of GNSS Products

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Recent studies in different volcanoes worldwide, from Mt. Redoubt in Alaska to Mt. Etna in Italy, have focused on the possibility to detect volcanic plumes by means of GNSS products. The proposed approaches follow essentially two paths: i) the direct satellite signal strength measured by the signal to noise ratio (SNR), data and ii) the post-fit phase residuals which represent the unmodelled contribution to positioning processing. The two approaches, having completely independent foundations, show different peculiarities in detecting anomalies in atmosphere (e.g. SNR is not sensitive to water vapour variations, and can be only attenuated by the presence of anomalies). Here, we review the two techniques in the light of new data coming from the recent eruptions at Mt. Etna, and propose a model to integrate information coming from the different techniques, different satellites and stations. Results suggest that, despite still not enough robustly, there are evidences of detectable interaction between volcanic plume and GNSS products.