**Ground-based images and cloud altitude parameterization**

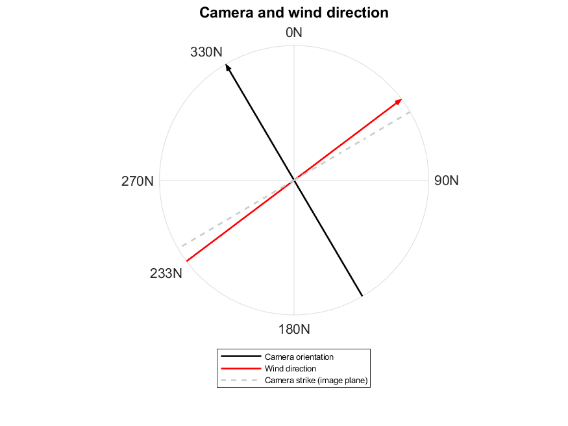
## First case study: the ash-rich cloud on the 10th of November 2023 at Sakurajima



*Snapshot of the explosive event at 11:25:23 am (local time).*



*The same snapshot with isolines of equal elevation (m) within the cloud plane (crater rim altitude in the cloud plane is defined at 0 m), following the Simionato et al. (2022) and Snee et al. (2023) procedures.*



*Camera and wind direction at 11:25:23 am (local time). Wind direction was retrieved from the ERA5 global reanalysis database (Hersbach et al. 2018, 2020).*

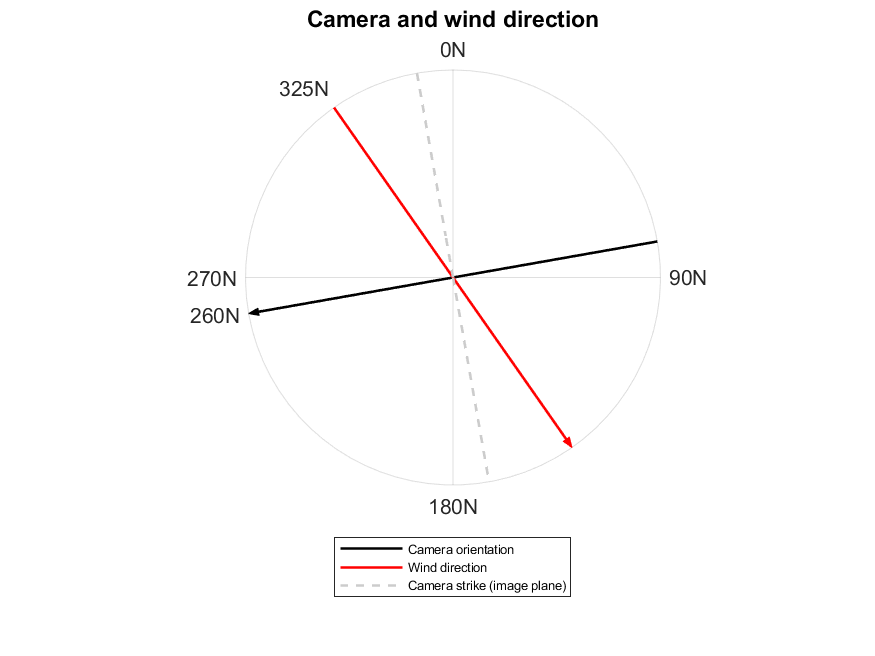
## Second case study: the ash-rich cloud on the 11th of November 2023 at Sakurajima



*Snapshot of the explosive event at 02:28:47 pm (local time).*



*The same snapshot with isolines of equal elevation (m) within the cloud plane (crater rim altitude in the cloud plane is defined at 0 m), following the Simionato et al. (2022) and Snee et al. (2023) procedures.*

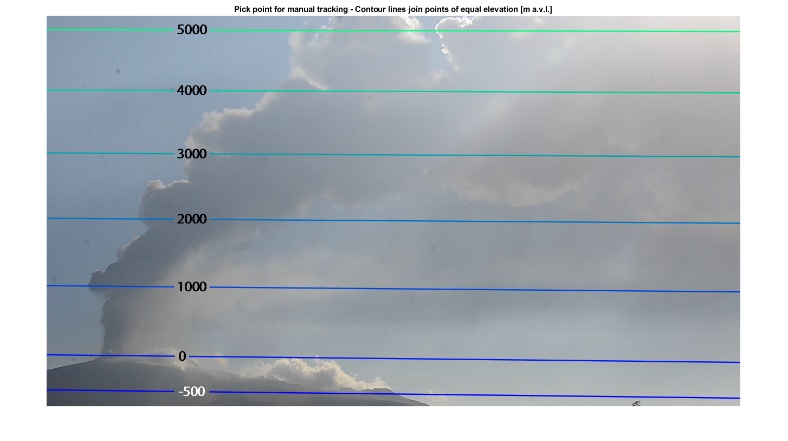


*Camera and wind at 02:28:47 am(local time). Wind direction was retrieved from the ERA5 global reanalysis database (Hersbach et al. 2018, 2020).*

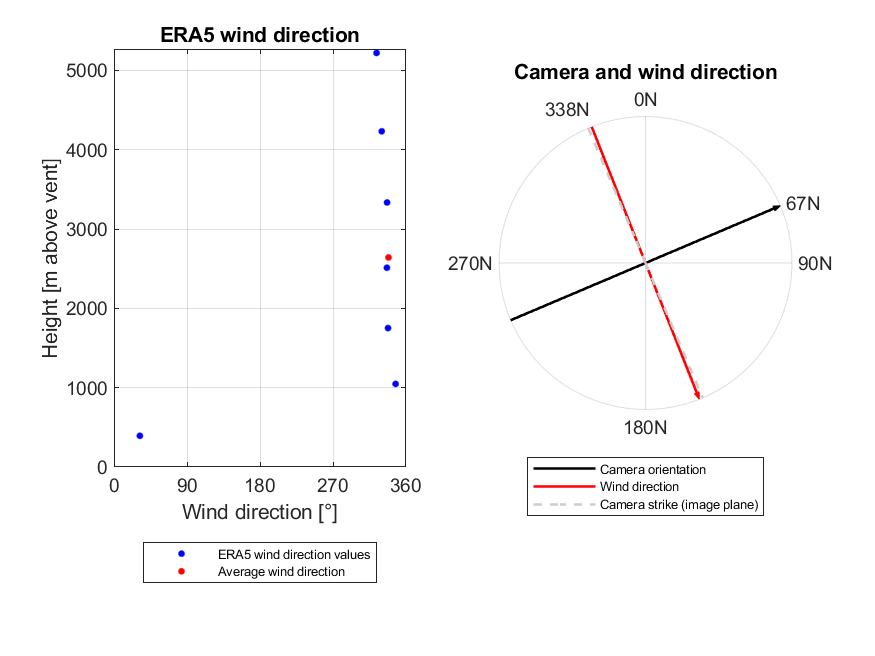
## Third case study: the ash-rich cloud on the 23rd of July 2024 at Etna



*Snapshot of the paroxysmal eruption at 09:29:00 am (local time).*



*The same snapshot with isolines of equal elevation (m) within the cloud plane (crater rim altitude in the cloud plane is defined at 0 m), following the Simionato et al. (2022) and Snee et al. (2023) procedures.*



*Camera and wind direction at 02:28:47 am (local time). Wind direction was retrieved from the ERA5 global reanalysis database (Hersbach et al. 2018, 2020).*

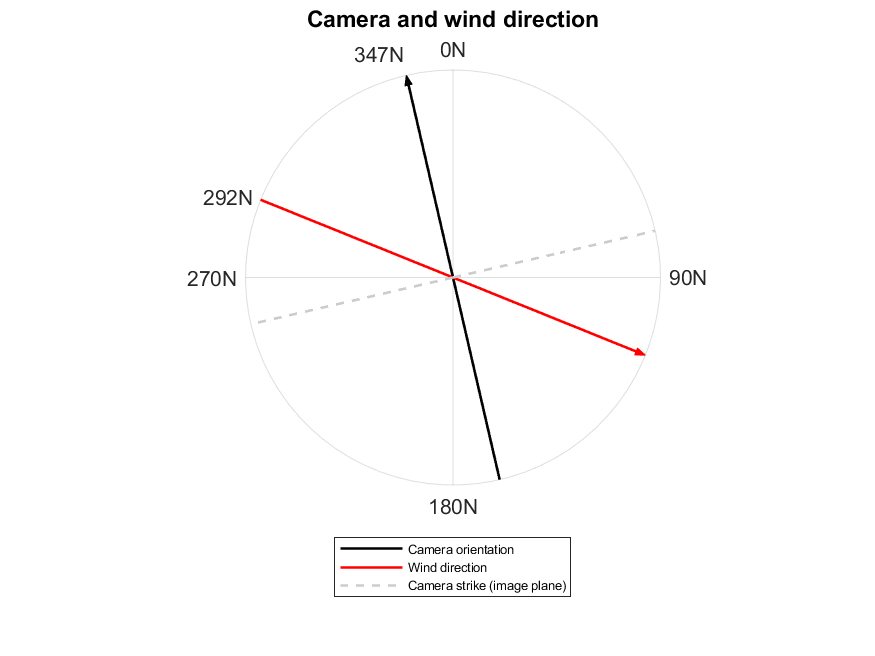
## Fourth case study: the gas-rich cloud on the 19th of November 2023 at Sakurajima



*Snapshot of the degassing event at 03:11:59 pm (local time).*



*The same snapshot with isolines of equal elevation (m) within the cloud plane (crater rim altitude in the cloud plane is defined at 0 m), following the Simionato et al. (2022) and Snee et al. (2023) procedures.*



*Camera and wind direction at 03:11:59 pm (local time). Wind direction was retrieved from the ERA5 global reanalysis database (Hersbach et al. 2018, 2020).*

## References

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* Snee, E., Jarvis, P., Simionato, R., Scollo, S., Prestifilippo, M., Degruyter, W., & Bonadonna, C. (2023). Image analysis of volcanic plumes: A simple calibration tool to correct for the effect of wind. Volcanica, 6, 447–458. <https://doi.org/10.30909/vol.06.02.447458>