

| Perturbation | HTOP | PDUR | AEC | AOT | Reference |
|---|----------|------------|--------------------------|------------|--|
| Volcanic events | | | | | |
| Major eruption (Mt. Pinatubo, Philippines, June 1991) | 25–35 km | Years | 25 Mm ⁻¹ | 0.2–0.25 | Ansmann et al. (1997); Jäger (2005); Trickl et al. (2013); Sakai et al. (2016); Zuev et al. (2017) |
| Moderate eruption (midlatitudes, tropics) | 15–25 km | Months | 5–15 Mm ⁻¹ | 0.02–0.025 | Mattis et al. (2010); Uchino et al. (2012); Trickl et al. (2013); Sakai et al. (2016); Khaykin et al. (2017); Zuev et al. (2017) |
| Quiet periods | | | 0.2–0.6 Mm ⁻¹ | 0.004 | Jäger (2005); Khaykin et al. (2017) |
| Smoke events | | | | | |
| Extreme case (Canadian fires, August 2017; Australian fires, February 2009) | 15–25 km | Months | 500 Mm ⁻¹ | 0.5–1.0 | This study; Khaykin et al. (2018); Siddaway and Petelina (2011); de Laat et al. (2012) |
| Typical case | 15–20 km | Days/weeks | 20–30 Mm ⁻¹ | 0.02 | Fromm et al. (2010) |
| Background conditions | | | 1.5 Mm ⁻¹ | 0.005 | Renard et al. (2005, 2008) |