

# Plume height during the 2014-2015 Holuhraun volcanic eruption

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Along with the rifting event and caldera subsidence in the Bárðarbunga central volcano in Iceland, an effusive basaltic eruption started in Holuhraun (64°52'N, 16°50'W, 770 m a.s.l.) on 29 August 2014. After a few hours it halted, but started again on 31 August. The eruption ended half a year later, on 27 February 2015. Associated with the eruption was a plume of juvenile water vapour and gases, mainly SO<sub>2</sub> and CO<sub>2</sub>. The plume contained very little ash. Due to the effusive nature of the eruption, the plume was weak and controlled to a large extent by atmospheric conditions, including winds and stability. We present a time series of the plume height, derived from various sources, including web cameras, flight and field reports. The maximum plume height close to the eruption site was mainly in the range 1-3 km above ground and the middle of the plume few kilometers from the eruption site often about 1 km above ground. We present preliminary comparison of the plume height time series to atmospheric conditions.

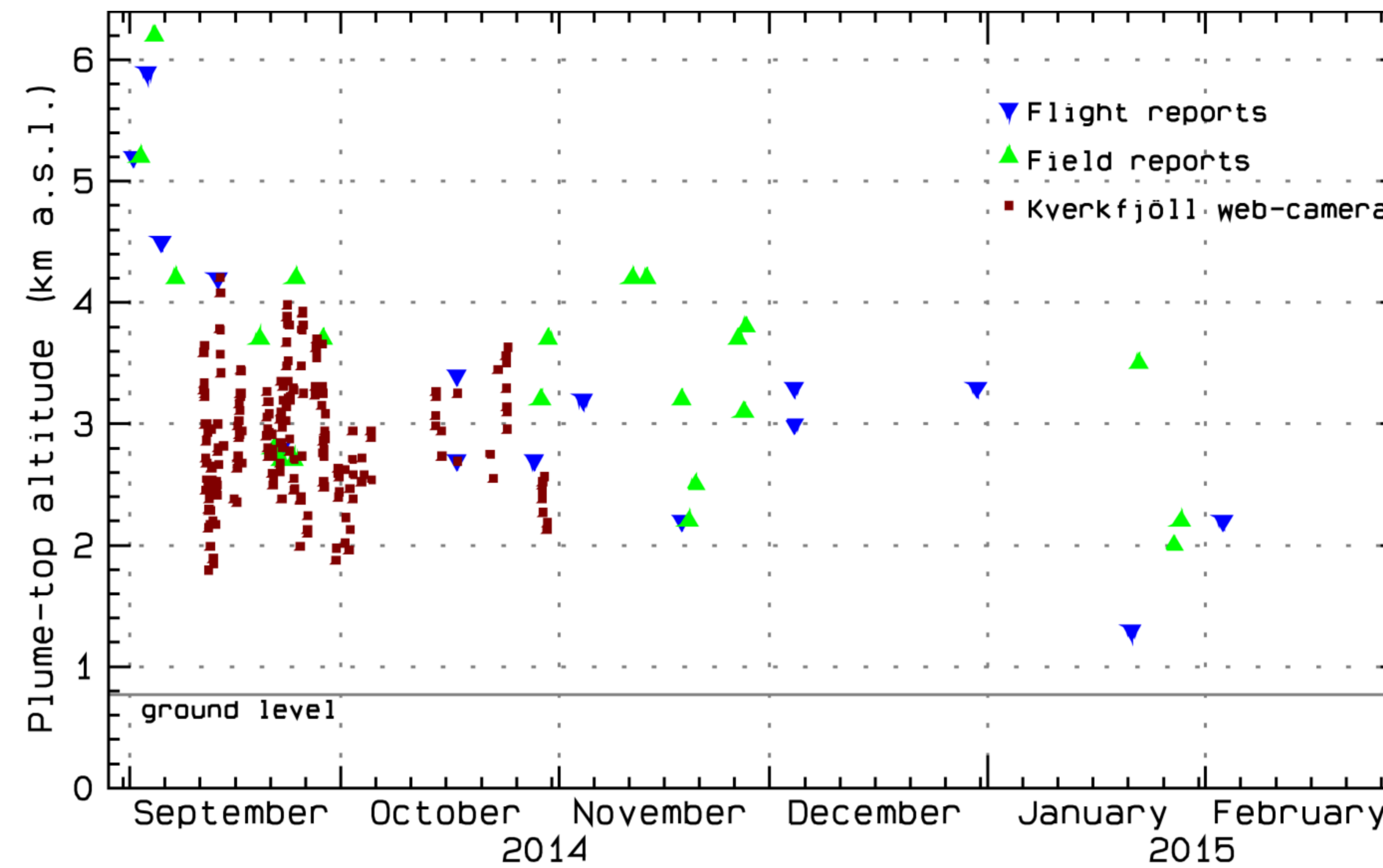


Figure 1. Estimates of the plume-top altitude (km a.s.l.) during the six months of the Holuhraun eruption.

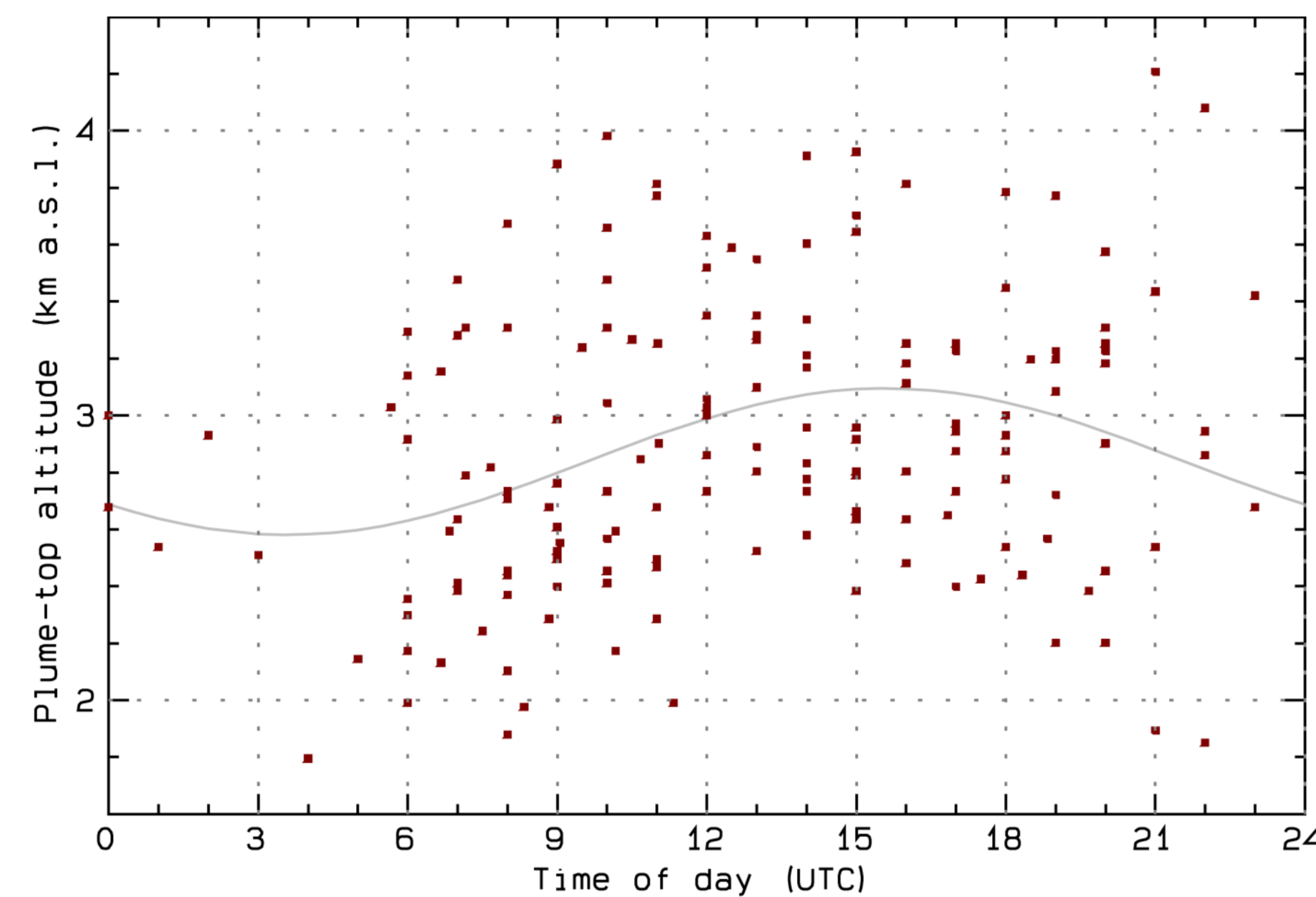


Figure 2. Diurnal variation of the plume height during September. Estimates of the plume-top altitude from the web camera in Kverkfjöll vs. time of day. The least-squares fitted sine wave:  
 $H = 2.84 + 0.26 \sin(2\pi(t+9.6)/24)$   
 has a maximum at the time 15:36.

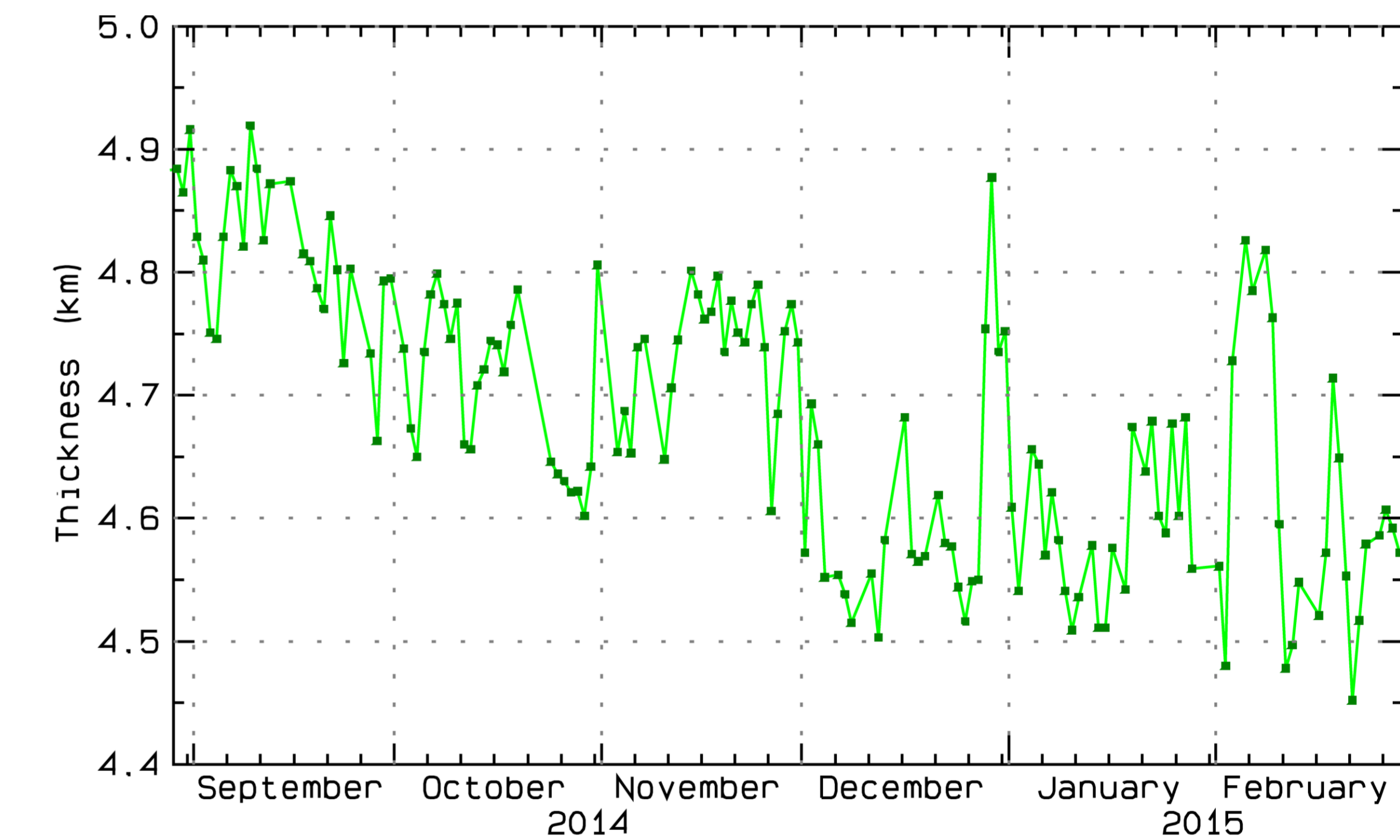
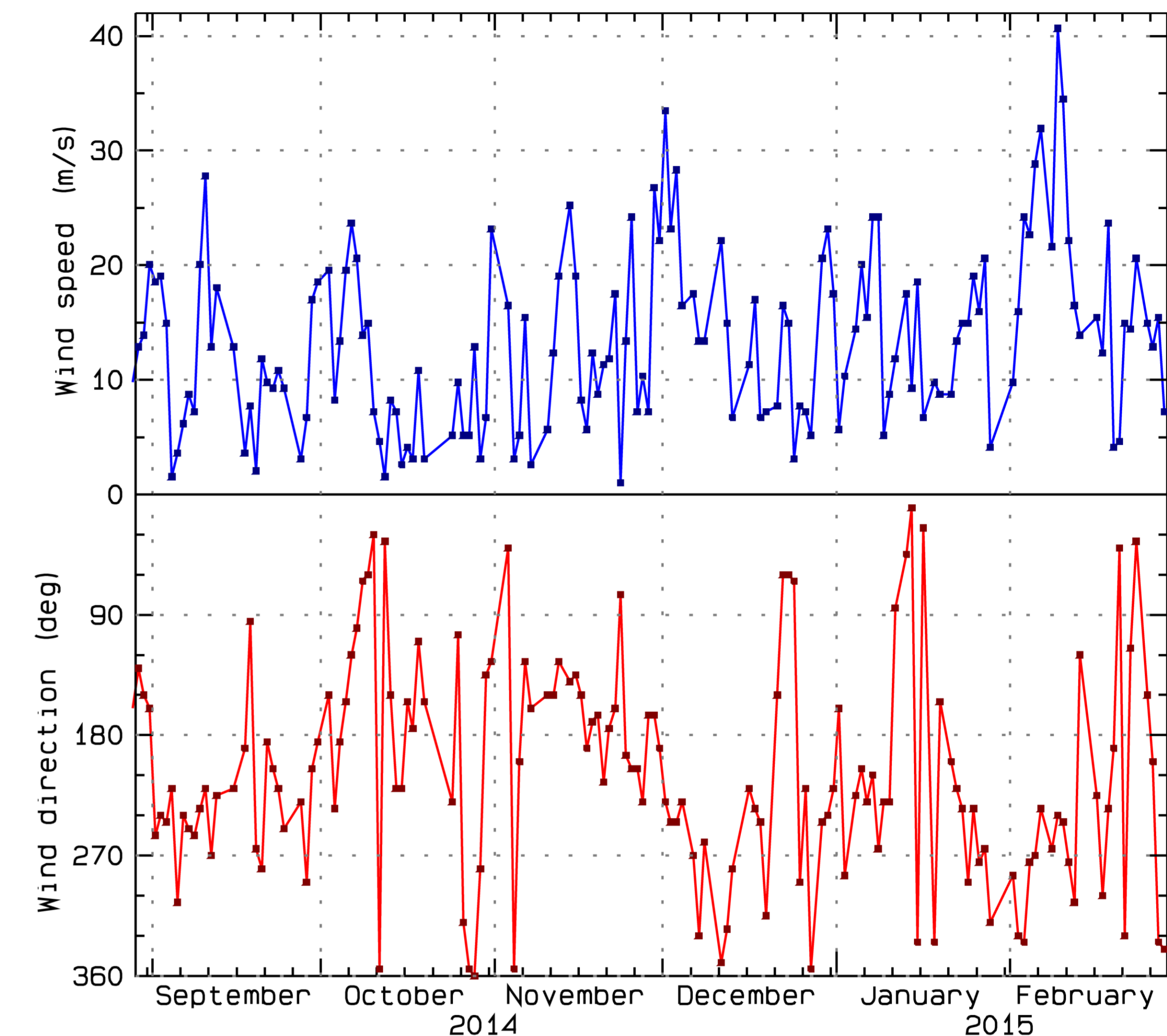


Figure 4. Atmospheric conditions in E-Iceland during the eruption. Measurements from a radiosonde, released at noon at Egilsstaðir (65°16'N, 14°24'W), 120 km ENE from the eruption site. The wind speed (blue) and direction (red) are shown at the 700 hPa pressure level (about 3 km a.s.l.). The atmospheric temperature is indicated by the thickness of the atmosphere (green) between the 925 and 500 hPa pressure levels (about 0.7 – 5.3 km a.s.l.).

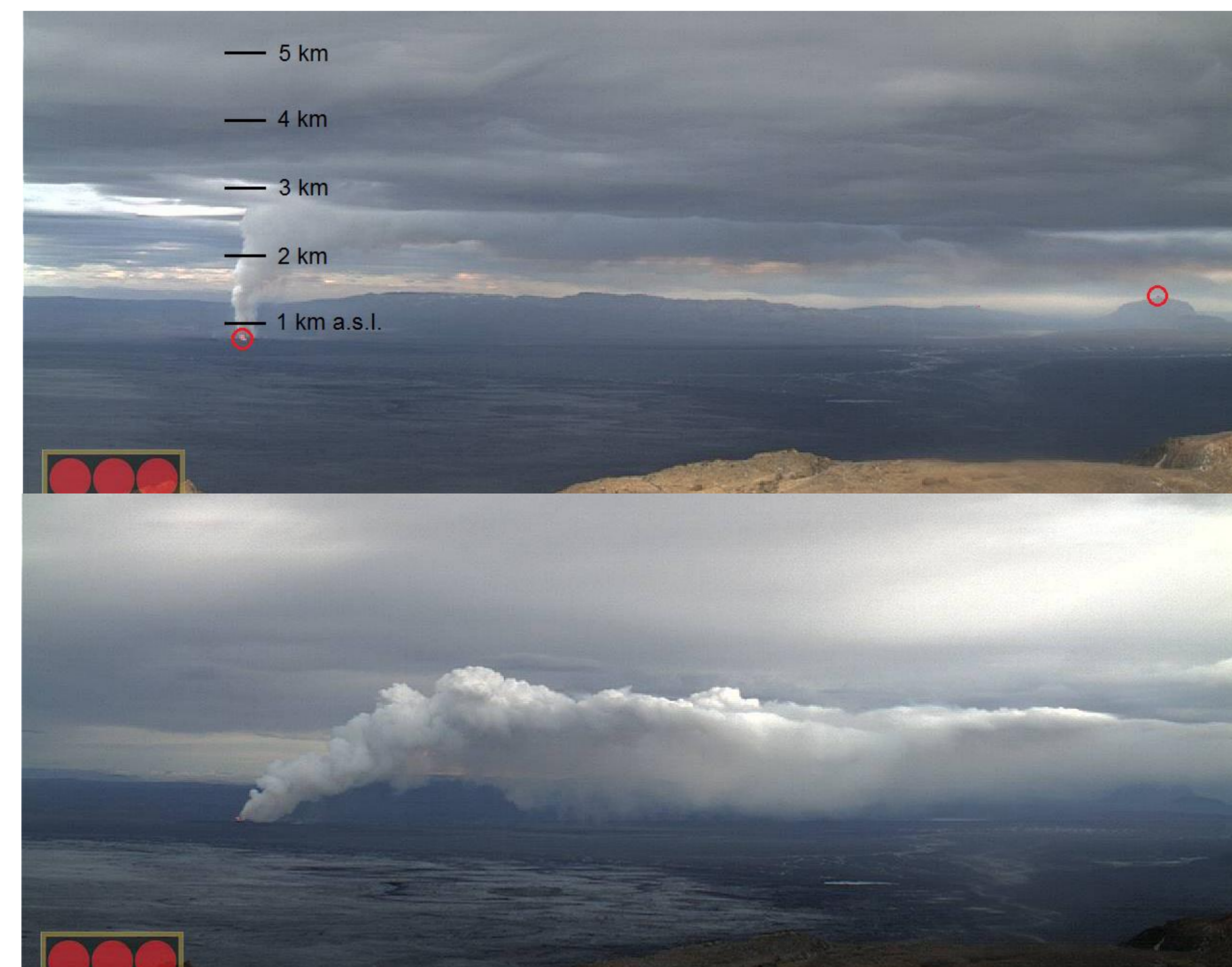


Figure 3. Images of the plume from the web camera at Kverkfjöll (64°40.5'N, 16°41.4'W, 1730 m a.s.l.).

