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Exploring the formation of the Arsia Mons Elongated Cloud on Mars

Jorge Hernandez Bernal, Agustín Sánchez-Lavega, and Teresa Del Río-Gaztelurrutia

University of the Basque Country, Escuela de Ingeniería de Bilbao, Applied Physics I, Bilbao, Spain (jorge.hernandez@ehu.eus)

In a recently published paper, we reported the existence and properties of the Arsia Mons Elongated Cloud (AMEC; Hernández-Bernal et al., 2021). We are now exploring models for the theoretical understanding of this outstanding phenomenon.

The AMEC forms at sunrise over the western slope of the Arsia Mons volcano, and for ~ 3 hours expands to the west following zonal winds, leaving behind a characteristic white bright tail. This process repeats in a daily cycle for a long season around the southern solstice. According to observations in MY34, the AMEC reaches a length of up to 1800 km, and expands at a velocity of around 170 m/s (~ 130 m/s in other years) at ~ 45 km in altitude. In comparison, winds predicted by the Global Circulation Model LMD-MCD are ~ 60 m/s (Millour et al. 2018).

The cloud is clearly driven by upward winds forced by the topography of the volcano. We are analysing from the theoretical perspective the formation and particular features of this cloud.

References

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