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Proof**CONTROL ID:** 1397713**TITLE:** Comparison of inflation processes at the 1859 Mauna Loa Flow, HI, and the McCartys flow field, NM.**PRESENTATION TYPE:** Poster Requested**CURRENT CATEGORY:** Volcanic eruptions and degassing**AUTHORS (FIRST NAME, LAST NAME):** Jacob E Bleacher¹, W. Brent Garry³, James R Zimbelman², Larry S Crumpler⁴**INSTITUTIONS (ALL):** 1. Planetary Geodynamics Lab, NASA GSFC, Greenbelt, MD, United States.

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ABSTRACT BODY: Basaltic lavas typically form channels or tubes during flow emplacement. However, the importance of sheet flow in the development of basaltic terrains received recognition over the last 15 years. George Walker's research on the 1859 Mauna Loa Flow was published posthumously in 2009. In this paper he discusses the concept of endogenous growth, or inflation, for the distal portion of this otherwise channel-dominated lava flow. We used this work as a guide when visiting the 1859 flow to help us better interpret the inflation history of the McCartys flow field in NM. Both well preserved flows display similar clues about the process of inflation. The McCartys lava flow field is among the youngest (~3000 yrs) basaltic lava flows in the continental United States. It was emplaced over slopes of <1 degree, which is similar to the location within the 1859 flow where inflation occurred. Although older than the 1859 flow, the McCartys is located in an arid environment and is among the most pristine examples of sheet flow morphologies. At the meter scale the flow surface typically forms smooth, undulating swales that create a polygonal terrain. The literature for similar features includes multiple explanatory hypotheses, original breakouts from adjacent lobes, or inflation related upwarping of crust or sagging along fractures that enable gas release. It is not clear which of these processes is responsible for polygonal terrains, and it is possible that one explanation is not the sole cause of this morphology between all inflated flows. Often, these smooth surfaces within an inflated sheet display lineated surfaces and occasional squeeze-ups along swale contacts. We interpret the lineations to preserve original flow direction and have begun mapping these orientations to better interpret the emplacement history. At the scale of 10s to 100s of meters the flow comprises multiple topographic plateaus and depressions. Some depressions display level floors with surfaces as described above, while some are bowl shaped with floors covered in broken lava slabs. The boundaries between plateaus and depressions are also typically smooth, grooved surfaces that have been tilted to angles sometimes approaching vertical. The upper margin of these tilted surfaces displays large cracks, sometimes containing squeeze-ups. The bottom boundary with smooth floored depressions typically shows embayment by younger lavas. It appears that this style of terrain represents the emplacement of an extensive sheet that experiences inflation episodes within preferred regions where lateral spreading of the sheet is inhibited, thereby forming plateaus. Depressions are often the result of non-inflation and can be clearly identified by lateral squeeze-outs along the pit walls that form when the rising crust exposes the still liquid core of the sheet. Our current efforts are focused on

detailed mapping of the McCartys flow field and modeling of the inflation process.
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Additional Details

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