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Solar wind parameters influencing magnetosheath jet formation: low and high IMF cone angle regimes

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Magnetosheath jets are dynamic pressure enhancements that are frequently observed downstream of the Earth's bow shock. Earthward propagating jets are significantly more likely to occur downstream of the quasi-parallel shock than the quasi-perpendicular shock. However, as the quasi-perpendicular geometry is the more common configuration at the Earth's bow shock, quasi-perpendicular jets can constitute a significant fraction of jets observed at Earth. Moreover, at other more quasi-perpendicular shock environments, such as at interplanetary shocks or the bow shocks of outer planets, they would be expected to form an even more significant portion of jets. We study the solar wind influence on jet formation in the quasi-parallel and quasi-perpendicular regimes by investigating jets in the Earth's subsolar magnetosheath separately during low and high IMF cone angles. We find that during low IMF cone angles (downstream of the quasi-parallel shock) jet occurrence near the bow shock is not sensitive to other solar wind parameters. However, during high IMF cone angles (downstream of the quasi-perpendicular shock) jet occurrence is higher during low B, low n, high beta, and high M_A conditions. This suggests that quasi-perpendicular jet formation is related to shock dynamics amplified by higher beta and M_A. These observations from a wide range of solar wind parameters also allow us to make predictions of jet occurrence at other planetary systems.