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We study an interesting wavy structure of ionosphere flow at sub-auroral latitudes observed by SuperDARN during a magnetic storm on March 17-18, 2015. The main phase of the storm shows at least two step development in Dst and apparently those two steps are associated with an more or less isolated substorm followed by a series of more intense substorms, respectively. The wavy modulation of ionospheric flow actually occurs during the relatively stagnant period between the two substorms. At sub-auroral latitude, the fast eastward flow prevailing from midnight to early morning during the first substorm ceases and subsequently the mid-latitude SuperDARN radars start to see a series of alternate flow reversals of toward-radar flows and away-from-radar flows. Each of the flow reversal structures has a longitudinal wave length of roughly ~1h magnetic local time (MLT) and fairly large peak-to-peak amplitude of several hundreds of m/s. Interestingly, those flow structures pass by the fields of view of the radars one after another, showing a clear westward propagation over a wide MLT range from early morning all the way to midnight. From the radar observation, the propagation velocity is roughly estimated to be ~2-3 km/s. The large propagation speed with the relatively stagnant background flow (less than ~200 m/s) indicates that the corresponding westward-eastward electric field is not of the ionospheric origin, but is imposed by the magnetosphere. The speed of ~2-3 km/s in the ionosphere corresponds to ~ a few thousands of km/s in the equatorial magnetosphere, comparable with the Alfven velocity. Thus we infer that the westward-traveling modulation of ionospheric electric field could be the footprint of ULF waves propagating in the anti-sunward direction through the dawnside magnetosphere. Further comparison with in situ observations by inner magnetospheric satellites will be made to test this hypothesis as well as to examine how these propagating structure of ionospheric electric field is generated.

