Bursts of band-limited Pc 1 waves (near 0.5 Hz) with normalized frequency $f / f_{\text{hi}} \sim 0.5$ were observed by the FGM and STAFF-SC instruments on the Cluster spacecraft during four passes in the high-latitude southern dusk flank polar cap during Fall 2002 and Fall 2003. Burst of transverse, left-hand polarized waves were embedded in regions of H$^+$ and O$^+$ ions streaming away from Earth along magnetic field lines at the same velocity (~140 km/s), observed by the CIS instrument. Waves occurred only when H$^+$ fluxes increased by factors of 10-1000 and energies of both ion species increased by factors of up to 10. The waves were generally associated with intervals of southward IMF Bz and/or large IMF By, but showed no significant dependence on solar wind pressure. Comparison of such streaming ion events with and without waves in the Cluster data base is used to determine threshold conditions for wave growth. Further analysis of these waves (including polarization analysis using PRASSADCO) and of the ion distributions associated with them will also be used to distinguish between two possible candidate wave generation mechanisms: the left-hand beam resonant instability and the ion cyclotron instability (propagating with or against the beam, respectively).