variable name	*description*	*units*	*resolu-tion*	*range*	*plot range*	*fill data*	*notes*
date	year and day of year	–	1 sec	–	–	n/a	year and day of year in yyyyddd format
time	time of day since midnight UT	seconds	1 sec	0 - 86399	0 - 86399	n/a	time of the data in seconds of the day
mlat	magnetic latitude	degrees	1 sec	-90. – +90.	-90. – +90.	n/a	magnetic latitude of field line at s/c mapped to 120 km
mlt	magnetic local time	hour and decimal hour	1 sec	0.0 – 23.99	0.0 – 23.99	n/a	magnetic longitude of field line at s/c mapped to 120 km
glat	geographical latitude	degrees	1 sec	-90. – +90.	-90. – +90.	n/a	geographic latitude of s/c
glon	geographic east longitude	degrees	1 sec	0.00 – 359.99	0.00 – 359.99	n/a	geographic east longitude of s/c
sza	solar zenith angle	degree	1 sec	0.0 – 180.0	0.0 – 180.0	n/a	angle between the sun-earth line and the s/c-center of earth line
alt	altitude	km	1 sec	820. – 870.	820. – 870.	n/a	altitude of the s/c above earth's surface
vx	median filtered and smoothed ion flow in the ram direction	m/s	1 sec	-2000. – +2000.	-2000. – +2000.	-999999.	median filtered and smoothed ion flow in the ram direction from the fits to the RPA curve
vxqual	quality flag for Vx data	numerical flags	1 sec	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain 9-caution (sun glint or high-energy particles)
vxrms	root mean square of the RPA fit	unitless	1 sec	0-999	0-99	-999999.	root mean square of the fit to the RPA curve giving an indication of the quality of the RPA data for this sweep
corrpaqual	overall quality flag for the RPA data	numerical flags	1 sec	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain

							9-caution (sun glint or high-energy particles)
rpainfo	flag for RPA RPAsweep direction	–	1 sec	1 – 2	1 – 2	-999999.	1-retarding potential increasing 2- retarding potential decreasing
vy	ion flow in the horizontal crosstrack direction	m/s	1 or 2 s depending on mode	-2800. – +2800.	-2000. – +2000.	-999999.	crosstrack horizontal ion flow from IDM, positive is in the sunward direction regardless of the orientation of the orbit, data taken in two modes: normal and slow (see nmbpts)
vyqual	quality flag for Vy data	numerical flags	1 or 2 s depending on mode	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain 6-good (F17) 7-fair (F17) 8-caution (F17) 9-caution (sun glint or high-energy particles)
vyrms	standard deviation of the Vy flow	m/s	1 or 2 s depending on mode	0. – +2800.	0. – +2800.	-999999.	standard deviation of the six Vy samples taken per second in the normal mode, fill data in slow mode
vz	ion flow in the vertical crosstrack direction	m/s	1 or 2 s depending on mode	-2800. – +2800.	-2000. – +2000.	-999999.	crosstrack vertical ion flow from IDM, positive is in the upward direction, data taken in two modes: normal and slow (see nmbpts)
vzqual	quality flag for Vz data	numerical flags	1 or 2 s depending on mode	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain 6-good (F17) 7-fair (F17) 8-caution (F17) 9-caution (sun glint or high-energy particles)
vzrms	standard deviation of the Vz flow	m/s	1 or 2 s depending on mode	0. – +2800.	0. – +2800.	-999999.	standard deviation of the six Vz samples taken per second in the normal mode, fill data in slow mode

nmbpt	number of data points in the Vy – Vz averages	–	1 sec	1 or 6	1 or 6	-999999.	the IDM operates in two modes: normal mode takes six horizontal and six vertical samples per second, slow mode is for low density conditions where only one sample is taken each second and alternates between directions
idmqual	overall quality flag for the IDM data	numerical flags	1 or 2 s depending on mode	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain 6-good (F17) 7-fair (F17) 8-caution (F17) 9-caution (sun glint or high-energy particles)
scvel	spacecraft velocity	m/s	1 sec	~ 7400 – 7500	~7400 – 7500	-999999.	orbital velocity of the spacecraft
temp	ion temperature	deg K	1 sec	500. – 20000.	500. – 5000.	-999999.	temperature of the ions in the plasma calculated from the fit to the RPA curve
tempqual	Quality flag for the ion temperature	numerical flags	1 sec	1 – 9	1 – 9	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain 9-caution (sun glint or high-energy particles)
pot	Potential of the SSIES instruments relative to the plasma ground	volts	1 sec	-3. – +2.	-2. – +1.	-999999.	all the SSIES instruments are held near the plasma ground potential, nominally about -1 V relative to the plasma, this value is calculated from the RPA curve fit, shown as “SC Potential” on the plots
dens	ion density calculated from the RPA	Ions/cc	1 sec	$0 – 10^7$	$200 – 10^7$	-999999.	Ion density of the plasma calculated from the fit to the RPA curve
densqual	quality flag for the RPA	numerical flags	1 sec	1 – 5	1 – 5	n/a	1-good 2-fair 3-caution 4-bad

	calculated ion density						5-uncertain
frach	fractional amount of H+ ions in plasma	–	1 sec	-0.1 – 1.05	0.0 – 1.05	-999999.	fractional amount of the plasma that is H+ based on the fitting of the RPA curve, because of uncertainties the value can exceed 1.0
frachqual	Quality flag for fractional H+	numerical flags	1 sec	1 – 5	1 – 5	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain
frache	fractional amount of He+ ions in plasma	–	1 sec	-0.1 – 1.05	0.0 – 1.05	-999999.	fractional amount of the plasma that is He+ based on the fitting of the RPA curve, because of uncertainties the value can exceed 1.0
frachequal	Quality flag for fractional He+	numerical flags	1 sec	1 – 5	1 – 5	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain
fraco	fractional amount of O+ ions in plasma	–	1 sec	-0.1 – 1.05	0.0 – 1.05	-999999.	fractional amount of the plasma that is O+ based on the fitting of the RPA curve, because of uncertainties the value can exceed 1.0
fracoqual	Quality flag for fractional O+	numerical flags	1 sec	1 – 5	1 – 5	n/a	1-good 2-fair 3-caution 4-bad 5-uncertain
bx	north component of Earth's magnetic field (IGRF)	nT	1 sec	-50000 – +50000	-50000 – +50000	-999999.	northward component of the Earth's magnetic field at the spacecraft's location calculated by the IGRF model
by	east component of Earth's magnetic field (IGRF)	nT	1 sec	-50000 – +50000	-50000 – +50000	-999999.	eastward component of the Earth's magnetic field at the spacecraft's location calculated by the IGRF model

bz	vertical downward component of Earth's magnetic field (IGRF)	nT	1 sec	-50000 – +50000	-50000 – +50000	-999999.	vertical downward component of the Earth's magnetic field at the spacecraft's location calculated by the IGRF model
ductdens	ion density from the scintillation meter	ions/cc	1 sec	$0 – 10^7$	$200 – 10^7$	-999999.	the average of the 24 Hz samples of the ion density by the scintillation meter, because of its large aperture this is considered the best meaure of the ion density
dmdens	Ion density from the IDM	ions/cc	1 sec	$0 – 10^7$	$200 – 10^7$	-999999.	the ion density based on the collector current in the IDM, because some or all of the light ions are excluded this density should always be equal to or less than the other ion densities
te	electron temperature	deg K	4 sec	500 – 10000	500 – 10000	-999999.	the electron temperature based on an onboard calculation of the Langmuir probe sweep which occurs once every 4 s
rpaground	potential difference between SSIES instruments and spacecraft ground	Volts	1 sec	-25 – +25	-25 – +25	-999999.	the DMSP spacecraft charges negative relative to the plasma ground so SSIES is electrically insolated and driven positive relative to spacecraft ground to keep the instrument near the plasma ground
dmhrough	roughness parameter of Vy	–	1 sec	0 – 1	0 – 1	-999999.	roughness parameter of Vy defined as (delta Vy / averaged Vy)
dmvrough	roughness parameter of Vz (delta Vz / averaged Vz)	–	1 sec	0 – 1	0 – 1	-999999.	roughness parameter of Vz defined as (delta Vz / averaged Vz)

ductdensrough	roughness parameter of SM density	–	1 sec	0 – 1	0 – 1	-999999.	roughness parameter of scintillation meter ion density defined as (delta Ni/ averaged Ni)
corvelx	corotation velocity of ionosphere in the ram direction	m/s	1 sec	-100 – 0	-100 – 0	-999999.	the ram component (x) of the corotation speed of the ionosphere at the spacecraft's location
corvely	corotation velocity of ionosphere in the horizontal crosstrack direction	m/s	1 sec	-600 – +600	-600 – +600	-999999.	the crosstrack horizontal component (y) of the corotation speed of the ionosphere at the spacecraft's location
corvelz	corotation velocity of ionosphere in the vertical direction	m/s	1 sec	0	0	-999999.	the crosstrack vertical component (z) of the corotation speed of the ionosphere at the spacecraft's location, since DMSP is in a circular orbit, this value is zero
vxraw	original unfiltered Vx flow	m/s	1 sec	-2000 – +2000	-2000 – +2000	-999999.	the unfiltered Vx flow values calculated by the RPA fitting routine
dens0v	ion density measured from the RPA at 0 volts	ions/cc	1 sec	$0 – 10^7$	$0 – 10^7$	-999999.	during each RPA sweep there is a point where the repeller voltage is 0 V so all the ions reach the collector, this is the ion density based on that measurement
ebm	high energy particles currents detected by the RPA	Amps	2 sec	-2×10^{-9} – $+2 \times 10^{-9}$	-2×10^{-9} – $+2 \times 10^{-9}$	-999999.	once every 2 s the RPA repeller voltage is set so high that only high energy electrons or ions reach the collector. A large current indicates high-energy particles or photo-electron production (a sun-glint).