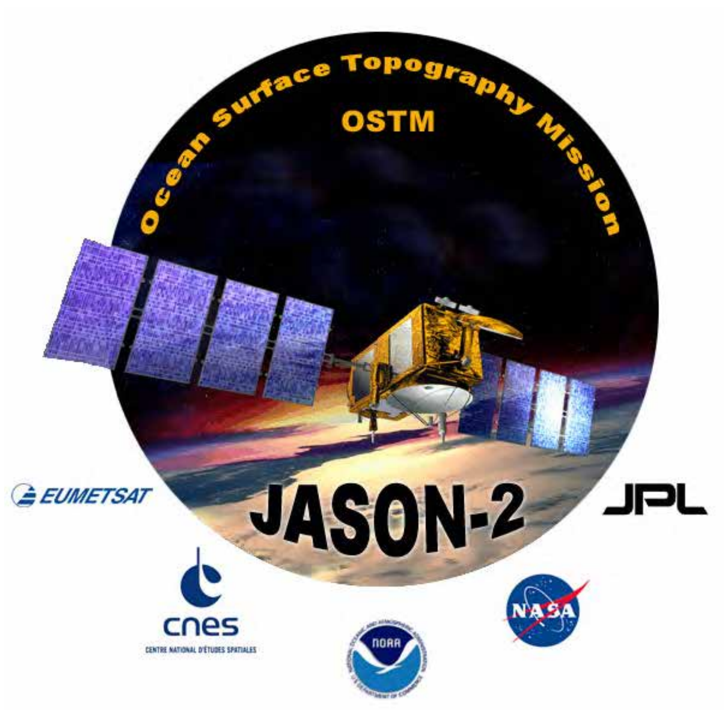
OSTM / Jason-2

Near Real-Time Data Annual Quality Report 2011-2012

August 2012



Prepared by:

U.S. Department of Commerce
National Oceanic and Atmospheric Administration (NOAA)
National Environmental Satellite, Data, and Information Service (NESDIS)
Center for Satellite Applications and Research (STAR)

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Preface

This document comprises the initial National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite, Data, and Information Service (NESDIS) baseline publication of the OSTM / Jason-2 *Near Real-Time Data Annual Quality Report 2011-2012* (August 3, 2012 issue).

The purpose of this document is to assess the overall quality of the Jason-2/OSTM near real-time products, Operational Geophysical Data Records (OGDRs), which are produced by NOAA and EUMETSAT. For each 10-day cycle, five primary parameters are displayed, divided into ascending and descending passes: sea surface height, significant wave height, ocean surface wind speed, altimeter-based ionosphere correction, and radiometer-based wet troposphere correction. All anomalies evident in these plots, such as orbital maneuvers or data gaps from calibration exercises, are described and documented based upon operational processing logs, etc. Statistics for data latency and data return are presented to demonstrate that high-level mission requirements have been met.

Future updates and revisions to this document will be produced and controlled by NOAA/NESDIS.

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Section 1.0 Introduction

The Jason-2/Ocean Surface Topography Mission is the successor to the Topex/Poseidon and Jason-1 radar altimetry missions. Jason-2 was launched from Vandenberg AFB on 20-Jun-2008, and the onboard instruments began producing data shortly thereafter, on 22-Jun-2008. Prior to achieving its final ~10-day exact repeat orbit, Jason-2 executed a series of maneuvers after injection into orbit. The exact repeat orbit was finally achieved on 04-Jul-2008. Since this resulted in a partial 10-day cycle, it was dubbed cycle-0. All subsequent cycles (beginning with cycle-1) are comprised of 254 half-revolution 'passes' with odd-numbered ascending passes extending from south to north, and even-numbered descending passes going north to south.

The primary instrument on-board Jason-2 is a dual-frequency radar altimeter (Ku-band & C-band) that provides measurements of sea surface height, significant wave height, and ocean surface wind speed. Three independent orbit determination systems are provided by the DORIS, GPSP, and passive laser retro-reflector instruments. Sea surface height is computed from the difference in orbital altitude from these systems and the fundamental range measurement (from round-trip travel time) made by the altimeter. Finally, a three-frequency passive microwave radiometer provides measurements of integrated total precipitable water, which is used to correct the sea surface height measurements for path delays due to atmospheric water vapor. Path delay corrections for the ionosphere are based on the dual-frequency altimeter measurements, and for the dry troposphere based on ECMWF model surface pressure fields. Finally, sea surface heights are corrected for signals not associated with large-scale ocean circulation (tides, inverse barometer, and sea state bias).

The Ocean Surface Topography Mission is a four-partner collaboration between NOAA, NASA, CNES and EUMETSAT. As partner operational agencies, NOAA and EUMETSAT share responsibility for production of near real-time data sets. These data, the Operational Geophysical Data Records (OGDRs) are the focus of this quality assessment report. OGDRs are typically produced 1-3 hours after the telemetry are received from the spacecraft, leading to nominal data latencies of 3-5 hours after accounting for two hours of data acquisition on board between data dumps to the ground. The data latency statistics over the fourth year of mission operations are discussed in the next section.

Section 2.0 Data Latency Statistics

The four project partners hold Operational Coordination Group (OCG) meetings weekly, and NOAA routinely reports statistics for near real-time product latency. The latency is computed for each OGDR, based on the time difference between the data itself (measurement time) and the time of availability of the product to end users. The calculation is performed for both the 3 hour / 75% requirement and 5 hour / 95% requirement. The overall latency of the OGDRs, produced by both NOAA and EUMETSAT, is accumulated over the previous week for reporting at the OCG meeting.

Figure 1 is a graphical representation of the weekly latency statistics over the fourth year of operations. At each weekly interval along the x-axis, the percentage of data available within 3 hours is shown by the height of the green area (on a y-axis scale of 60-100%). The percentage of data available within 5 hours is shown by the height of the combined green + yellow areas. Finally, the red areas show the percentage of data NOT available within 5 hours, as a difference between 100% and the yellow area. The target 75% and 95% requirements are shown as horizontal dashed lines.

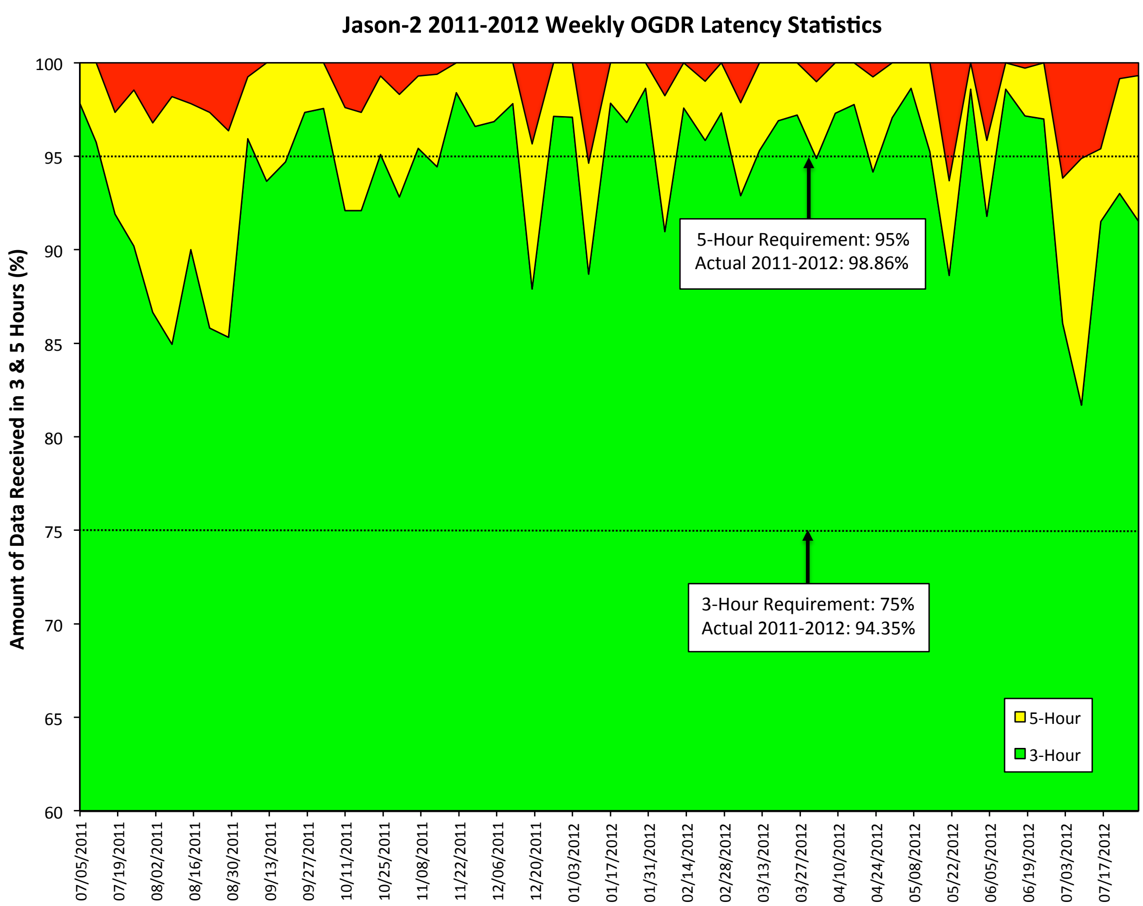


Figure 1 – Jason-2 OGDR Latency Statistics for July 2011 to July 2012

This figure demonstrates that the 3-hour/75% requirement was satisfied for all weeks. The 5-hour/95% requirement was not met for the four weeks ending 09-Jan-2012, 21-May-2012, 02-Jul-2012 and 09-Jul-2012. These were largely due to problems with the ground stations, resulting in data re-dumps. **The yearly averaged values (over the 58 weeks shown in Figure 1) are: 94.35% of all data were available within 3 hours and 98.86% of all data were available within 5 hours**.

Section 3.0 Data Quality Analysis Plots

In this section data from the fourth year of operations are analyzed, covering the time period from 07-Jul-2011 to 31-Jul-2012: cycles 111-150. This year's analysis is slightly longer than one year, and was extended through 31-Jul-2012 12:02Z to cover the last version 'C' OGDR. Next year's report will begin with the first version 'D' OGDR from 31-Jul-2012. Because of this, the first part of cycle-150 is included in this report and the last part of cycle-150 will be in next year's report. We focus the analysis on five primary geophysical parameters measured by the on-board instruments: sea surface height anomaly (relative to a multi-year altimetric mean sea surface), significant wave height, ocean surface wind speed, wet tropospheric path delay from the radiometer, and ionospheric path delay based on dual-frequency altimeter measurements.

Each of the five geophysical parameters are analyzed on a per-cycle basis, with data from ascending and descending portions of the ground track plotted separately to prevent overlapping points. The start and end times of each cycle are based on an average cycle duration of 9d 21h 58m 31.612s (856711.612 seconds). The start and end times in the plot labels are rounded to the nearest second, and agree within ± 2 seconds with the actual cycle boundaries. The individual 1-second data points, read from the NetCDF formatted OGDR files, are reported every 10-seconds along track. Each of these 10-second values is plotted as a filled circle, color coded by the rainbow scale based on a prescribed maximum-minimum range for that variable. For each ~10-day cycle, the five parameters are plotted on a single page as ten subplots (separate ascending/descending data) in Appendix-A. Each cyclic subplot represents a map view of a single variable, over the region 22°-382° longitude, ± 70° latitude. The longitude axis is offset by 22° to split the plots at Cape Agulhas, where there is minimal oceanic latitudinal extent between the Atlantic & Indian basins. Note that the final plot this year represents a 10-day period that ends with the last OGDR-C data point, thus representing a portion of cycles 149 and 150, in order to provide full geographical data coverage.

Plots for cycles 111-150, comprising the fourth year of operations for Jason-2, are contained in Appendix-A. These plots provide an excellent means of assessing the overall data coverage (or data gaps) as well as anomalies in the data values of the five analyzed parameters. If a parameter map has long stretches of data that are 'off-scale' in either the positive (red) or negative (blue) directions, there is a clear indication of degraded quality. These 40 plots form the basis of the quality assessment provided in the following sections.

Section 4.0 Anomalies Impacting Quality

Since the launch of Jason-2 a variety of anomalies have occurred which impact the quality of the data. These can be related to spacecraft maneuvers, instrumental problems, telemetry transmission difficulties, ground station anomalies, or data processing errors. The anomalies impacting data quality from July 2011 to July 2012 are as follows:

a. **Spacecraft maneuvers** - When maneuvers are performed the accuracy of the orbital information is degraded, leading to larger than normal once-per-revolution radial orbit error. This causes long wavelength errors in sea surface height anomaly, but has little impact on the other parameters. The spacecraft's attitude can also be affected, but the ground-based retracking of the radar return 'waveform' normally compensates for off-nadir excursions and there is minimal degradation of any of the measured parameters.

   Five cycles were affected by maneuvers this year:

   Cycle-116: Maneuver Burn from 2011-08-28 09:59:31 to 09:59:33 (pass 053). The affected OGDR is:

   JA2_OPN_2PcS116_052_20110828_090804_20110828_130352

   Cycle-122: Maneuver Burn from 2011-10-28 00:07:00 to 00:07:02 (pass 081). The impact of this maneuver is not apparent in the Cycle-122 plot in Appendix A. The affected OGDR is:

   JA2_OPN_2PcS122_079_20111027_222130_20111028_001735

   Cycle-127: Maneuver Burn from 2011-12-16 03:18:23 to 03:18:25 (pass 070). The affected OGDR is:

   JA2_OPN_2PcS127_070_20111216_025927_20111216_043233

   Cycle-135: Maneuver Burn from 2012-03-08 19:29:26 to 19:29:28 (pass 181). The impact of this maneuver is not apparent in the Cycle-135 plot in Appendix A. The affected OGDR is:

   JA2_OPN_2PcS135_179_20120308_174156_20120308_193849

   Cycle-143: Maneuver Burn from 2012-05-21 08:41:43 to 08:41:45 (pass 033). The affected OGDR is:

   JA2_OPN_2PcS143_033_20120521_082744_20120521_102425

b. **On-board software and calibration file uploads** - When new instrument calibration coefficients, or onboard software patches, are uploaded to the satellite data gaps usually result whose extent can vary from just a few seconds to hours in length. This includes events associated with software uploads, including Digital Elevation Model (DEM) updates, as well as calibration files.

Two cycles were affected by calibration updates this year:

Cycle-115: A CAL2 calibration was performed on 2011-08-25 from 11:07:35 to 11:40:56 (pass 232). A CNG calibration was performed on 2011-08-25 from 14:12 to 14:38 (pass 235, mostly over land). Due to these calibrations, passes 232 and 235 are missing 65% and 8% of their ocean measurements. The affected OGDRs are:

JA2_OPN_2PcS115_232_20110825_105801_20110825_122839
JA2_OPN_2PcS115_232_20110825_105801_20110825_154730

Cycle-132: A CAL2 calibration was performed on 2012-02-10 from 00:42:26 to 01:14:03 (pass 232). A CNG calibration was performed on 2012-02-10 from 03:47:11 to 04:13:20 (pass 235, mostly over land). Due to these calibrations, passes 232 and 235 are missing 65.4% and 8.3% of their ocean measurements. The affected OGDRs are:

JA2_OPN_2PcS132_231_20120210_003211_20120210_023158
JA2_OPN_2PcS132_234_20120210_023157_20120210_055118

c. **Instrument and ground segment issues** – Anomalies at the instrument level, or in the ground segment, can result in partial loss of data or degradation in performance. This year there were three instances where operator errors resulted in data loss, and a single instance where the TM-NRT software failed to produce an OGDR:

Cycle-135: A part of pass 105 is missing (53.77% of global missing measurements, 24.80% over ocean) due to technical problem and operator error. ACKMM inadvertently sent, resulting in a TM gap of about 32 minutes (between 20120305_195448 and 20120305_202614). The affected OGDR is:

JA2_OPN_2PcS135_103_20120305_182926_20120305_195448

Cycle-136: A part of pass 191 is missing (62.15% of global measurements and 55.86% measurements over sea). The loss is due to a problem of ACK on 2012-03-19 between 02:15:17 and 02:50:11. The affected OGDR is:

JA2_OPN_2PcS136_189_20120319_005404_20120319_021517

Cycle-147: It appears an ACK was sent by accident even though percentages were below 98% and the ACK should NOT have been sent. The affected OGDR is:

JA2_OPN_2PcS147_022_20120629_132702_20120629_152250

Cycle-148: Product generation failure at ESPC on 2012-07-08: no OGDR generated. This resulted in missing OGDR data for 1 hour 4 minutes 27 seconds between 16:38:00 -

17:42:27 UTC. The missing OGDR was between this pair of files:

JA2_OPN_2PcS147_254_20120708_145509_20120708_163800
JA2_OPN_2PcS148_003_20120708_174227_20120708_201635

Note: this data was NOT lost in the IGDR or final GDR files.

d. **Unavailability or degradation of auxiliary data –** Computation of SSHA requires auxiliary data, which is not acquired by the on-board instruments. When these data are missing or degraded it can impact the quality of SSHA while not affecting SWH and wind speed.

One cycle was impacted by the unavailability of ECMWF auxiliary data due to networking issues between NOAA and EUMETSAT:

Cycle-121: The normal daily delivery of ECMWF grids did not occur on 14-Oct around 19Z due to the network outage, so the last available grids for processing had a valid time of 15-Oct-2011 at 12 UTC. The period of defaulted SSHA values was from 12:00-14:04 on 15-Oct-2011. The affected OGDR is:

JA2_OPN_2PcS121_014_20111015_104557_20111015_140418

Cycle-122: As an interesting side note - the plot of descending dual-frequency ionosphere corrections for cycle 122 has several passes with very high values, which appear to be in error. These extreme values are most likely associated with a large solar coronal mass ejection that occurred on 22-October-2011, Figure 2.

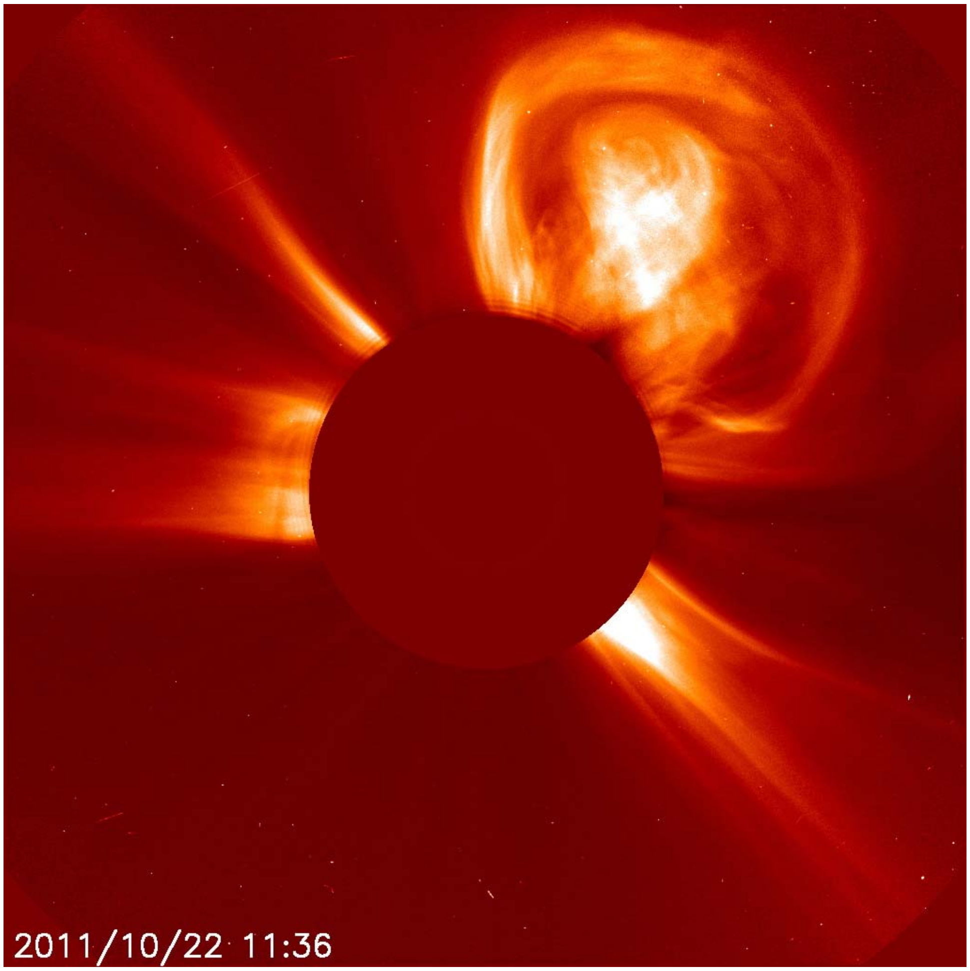


Figure 2. A large coronal mass ejection seen by the NASA/ESA Solar and Heliospheric Observatory's Large Angle and Spectrometric Coronagraph (LASCO) instrument, on 22-Oct-2011. Enhanced ionospheric activity was observed two days later, including spectacular auroral displays.

e. **Gaps in payload telemetry** – Occasionally there are additional losses of payload telemetry data, beyond the causes discussed above, which result in gaps in all the measured variables. Two cycles were affected by telemetry data gaps:

Cycle-145: There are two small portions of missing data in the North Atlantic on pass 143 (2012-06-14 between 11:41:15 and 11:42:58) and on pass 248 (2012-06-18 between 13:20:10 and 13:21:29) due to missing PLTM. The affected OGDRs are:

JA2_OPN_2PcS145_141_20120614_095130_20120614_114902
JA2_OPN_2PcS145_248_20120618_131830_20120618_145117

Cycle-147: There is a PLTM telemetry gap of 155 seconds from 2012-07-03 22:41:24 to 2012-07-03 22:43:59. The affected OGDR is:

JA2_OPN_2PcS147_132_20120703_202926_20120704_003829

Section 5.0 Analysis of Data Gaps in the OGDRs

There is a high-level Jason-2 mission/system requirement that is relevant to the anomalies discussed in the previous section:

> ***The GDR shall contain 95% of all possible over-ocean data (acquisition and archive) during any 12 month period, with no systematic gaps.***

To assess our performance with regard to this requirement, based on the near real-time OGDRs, all of the data for cycles 111-150 were checked for data gaps between measurements (and between files) when both of the two measurements was over the ocean. Using a nominal inter-record spacing, $\Delta t = 1.02$ seconds, a gap is identified whenever two measurements are separated by more than $2*\Delta t$. Duplicate data, associated with re-dumping of data stored on-board Jason-2 (i.e. when two OGDRs have the same start time) were skipped during gap detection.

The cumulative result over the 4759 analyzed OGDRs was a total of 22,041,084 over-ocean records (of the total 32,135,134 records) with missing records due to data gaps totaling 12,509. This equates to 3h 32m 40s of missing data over the course of more than a year. The gap analysis indicates that the total over-ocean OGDR data return is greater than 99.94%.

The following OGDRs had data gaps in excess of 30 seconds. Files denoted by a '*' do not represent actual data losses, as the missing data were contained within another (re-dumped) OGDR. The remaining gaps are visible in the cyclic plots of Appendix-A.

OGDR File Name	Gap	
JA2_OPN_2PcS115_232_20110825_105801_20110825_122839	1963	
JA2_OPN_2PcS127_108_20111217_143309_20111217_160351	245	*
JA2_OPN_2PcS128_248_20120101_234413_20120102_004920	1426	*
JA2_OPN_2PcS132_231_20120210_003211_20120210_023158	1963	
JA2_OPN_2PcS135_106_20120305_202614_20120305_222052	1850	
JA2_OPN_2PcS136_191_20120319_025011_20120319_045013	2054	
JA2_OPN_2PcS138_157_20120406_144347_20120406_150630	1426	*
JA2_OPN_2PcS142_059_20120512_105059_20120512_124516	233	*
JA2_OPN_2PcS145_141_20120614_095130_20120614_114902	100	
JA2_OPN_2PcS145_248_20120618_131830_20120618_145117	77	
JA2_OPN_2PcS146_022_20120619_152832_20120619_172420	259	*
JA2_OPN_2PcS147_022_20120629_132702_20120629_152250	252	
JA2_OPN_2PcS147_132_20120703_202926_20120704_003829	151	
JA2_OPN_2PcS148_003_20120708_174227_20120708_201635	3792	
JA2_OPN_2PcS149_158_20120724_170609_20120724_201452	1583	*

Section 6.0 Summary

The overall quality of the Jason-2/OSTM near real-time OGDR data is extremely good. Nine of the 40 cycles had noticeable defects (primarily gaps and maneuvers) in the cyclic plots: cycles 115, 116, 121, 127, 132, 135, 136, 147 and 148. The amount of missing data, attributed to all of the anomalies discussed in sections 4 and 5, is a little over three and a half hours. **This represents an over-ocean data return of 99.94%, over the time period of 1 year and 24 days analyzed in this report.**

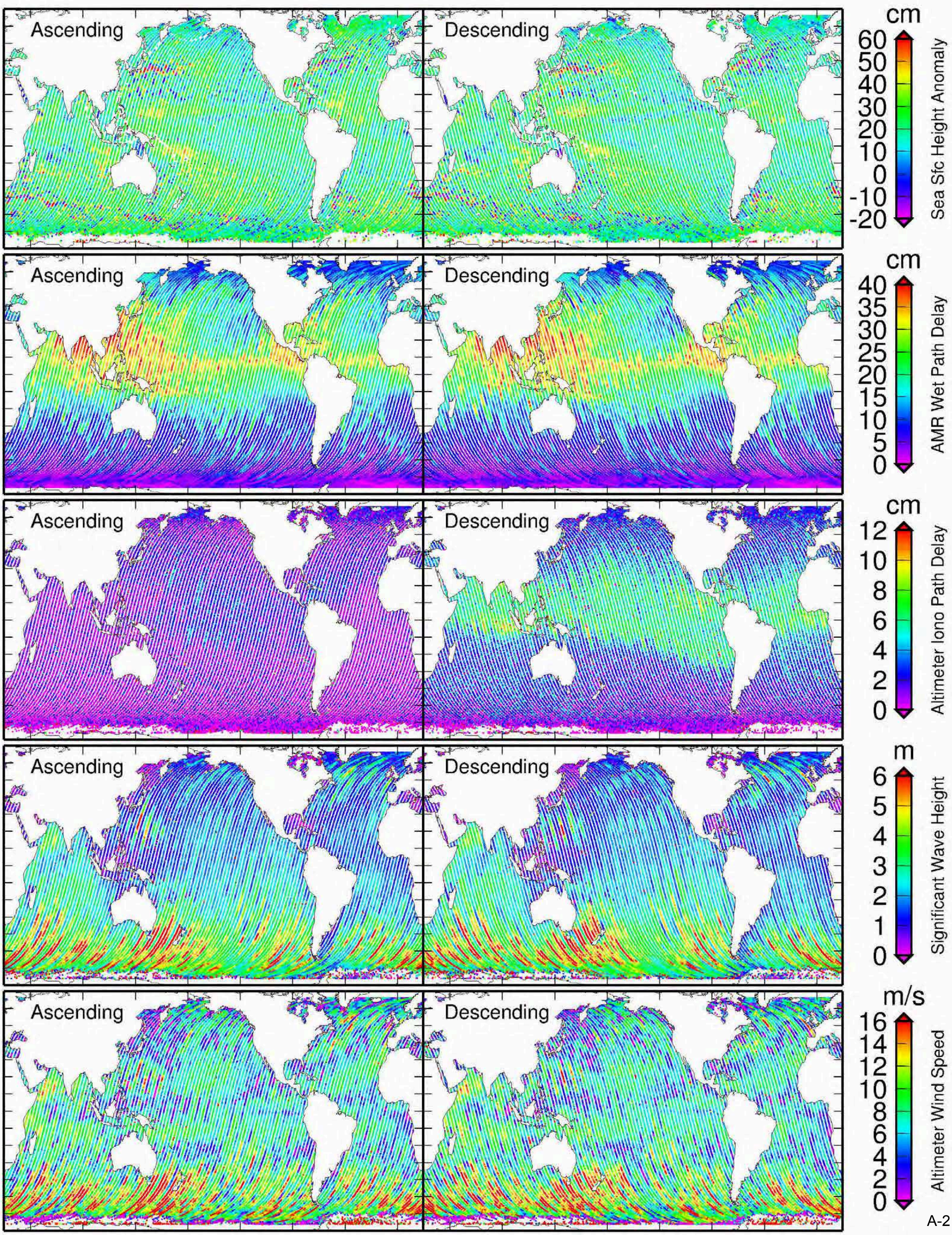
In addition to the high overall data return, the data availability in terms of latency is also well above the mission requirements: **94.35% of all data were available within 3 hours and 98.86% of all data were available within 5 hours**.

Operational monitoring of the OGDR data quality is ongoing at both NOAA and EUMETSAT, using the NRTAVS system developed under contract to JPL by NOAA. This monitoring tool generates plots similar to those presented below in Appendix-A. This tool provides a valuable diagnostic system for monitoring the OGDR data quality in near real-time.

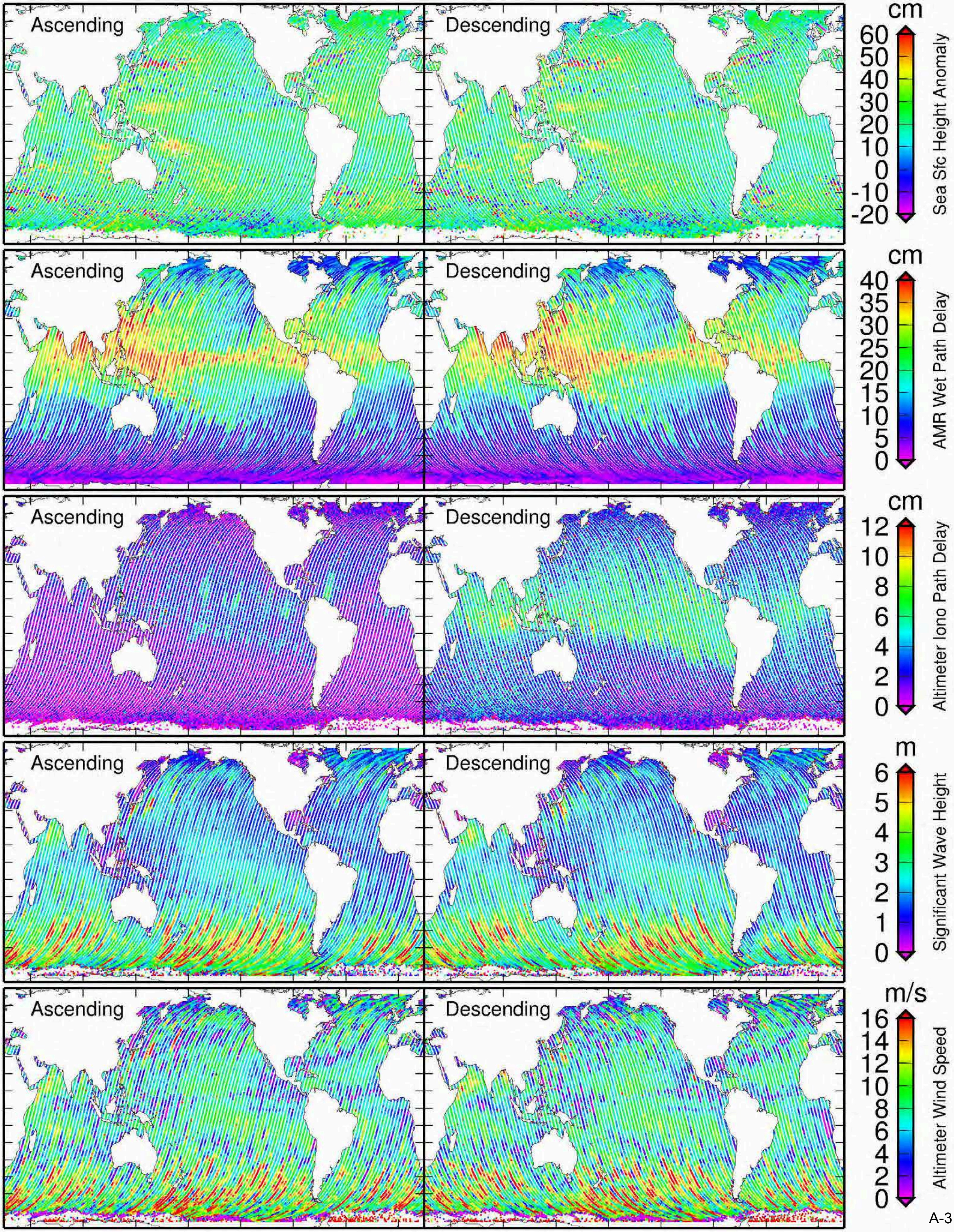
Appendix A. Cyclic Parameter Plots Cycle-111 to Cycle-150

See individual plots on the following 40 pages.

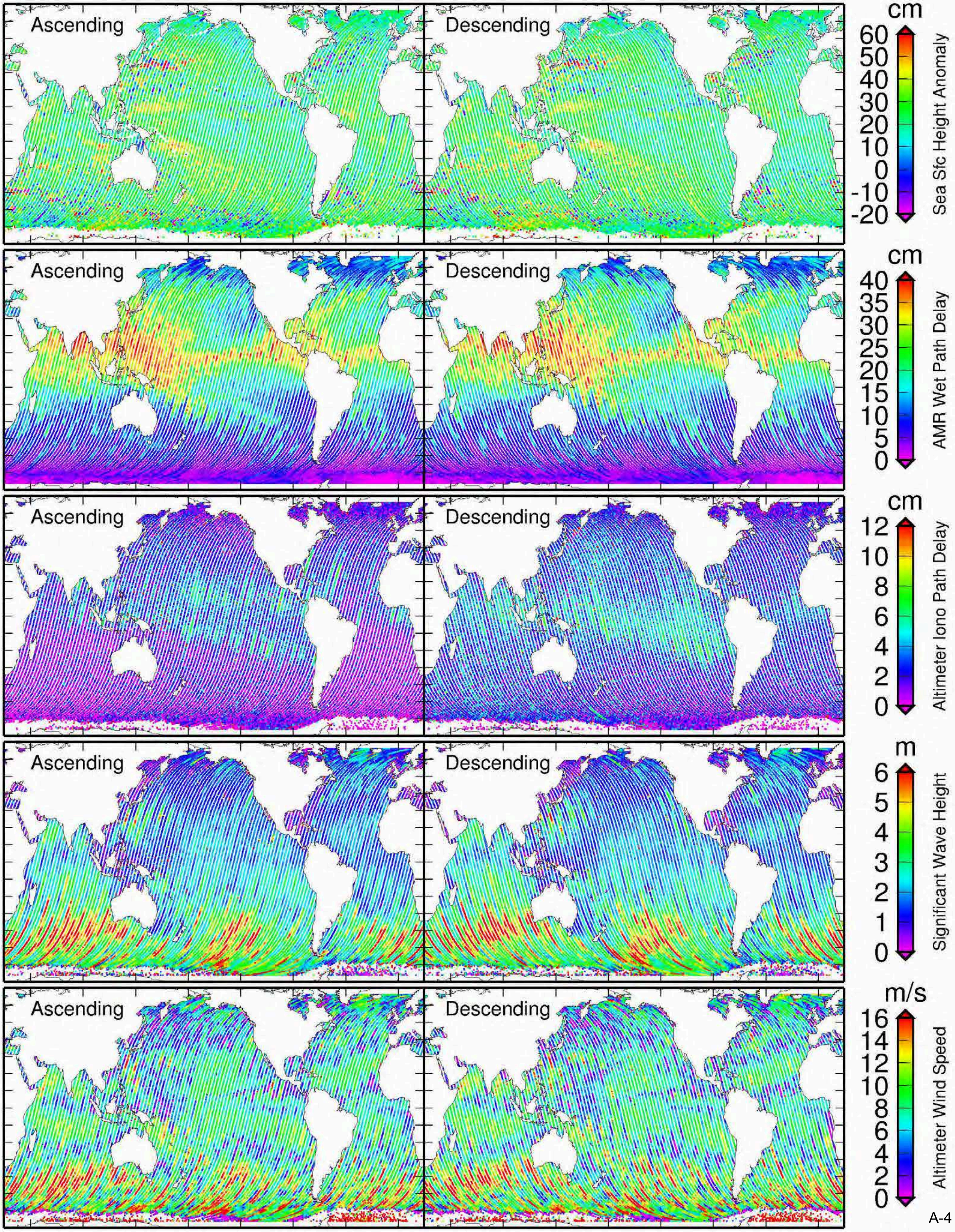
Jason-2 Cycle-111 2011-07-07 18:37:56 - 2011-07-17 16:36:27

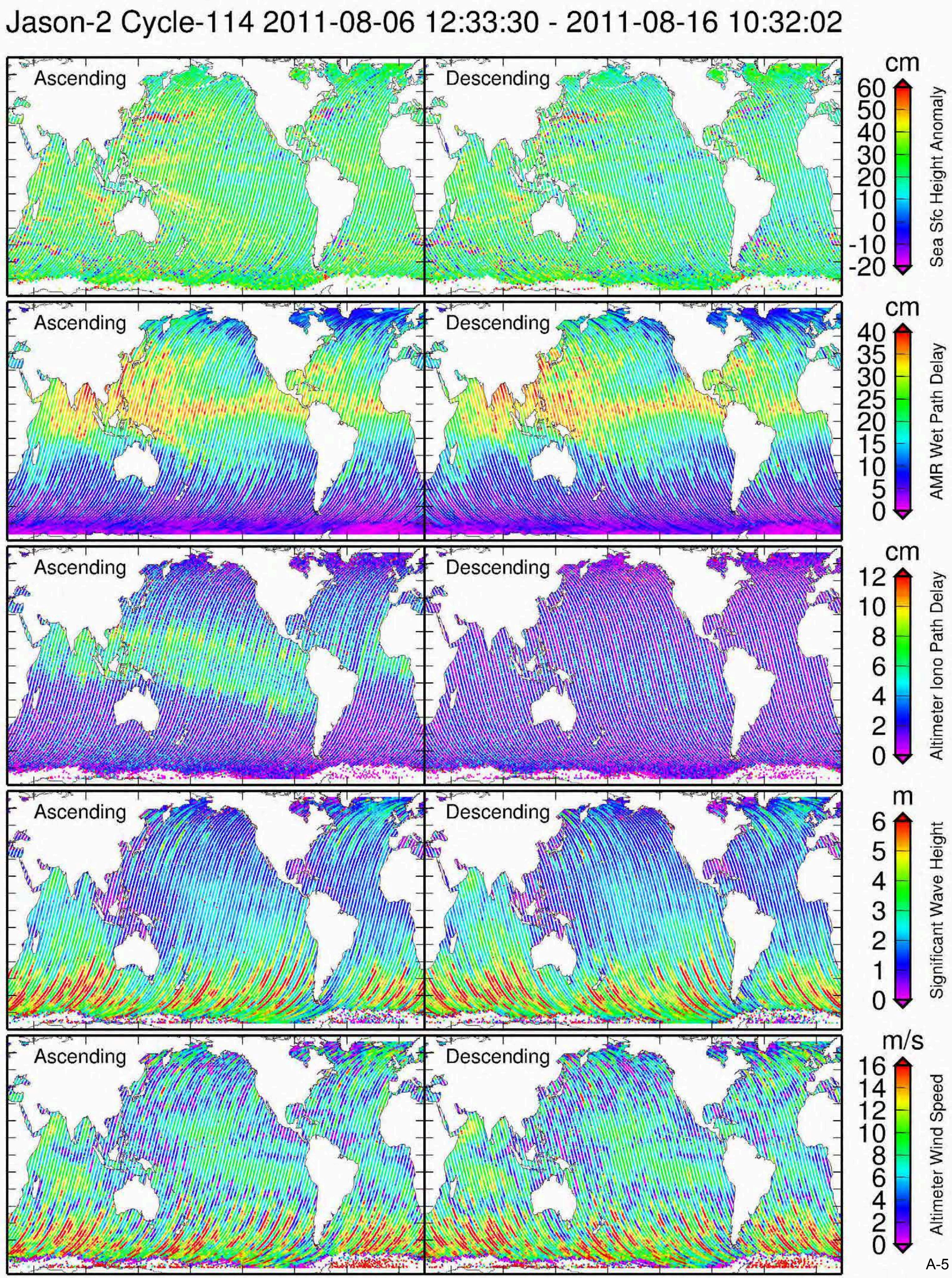


Jason-2 Cycle-112 2011-07-17 16:36:27 - 2011-07-27 14:34:59

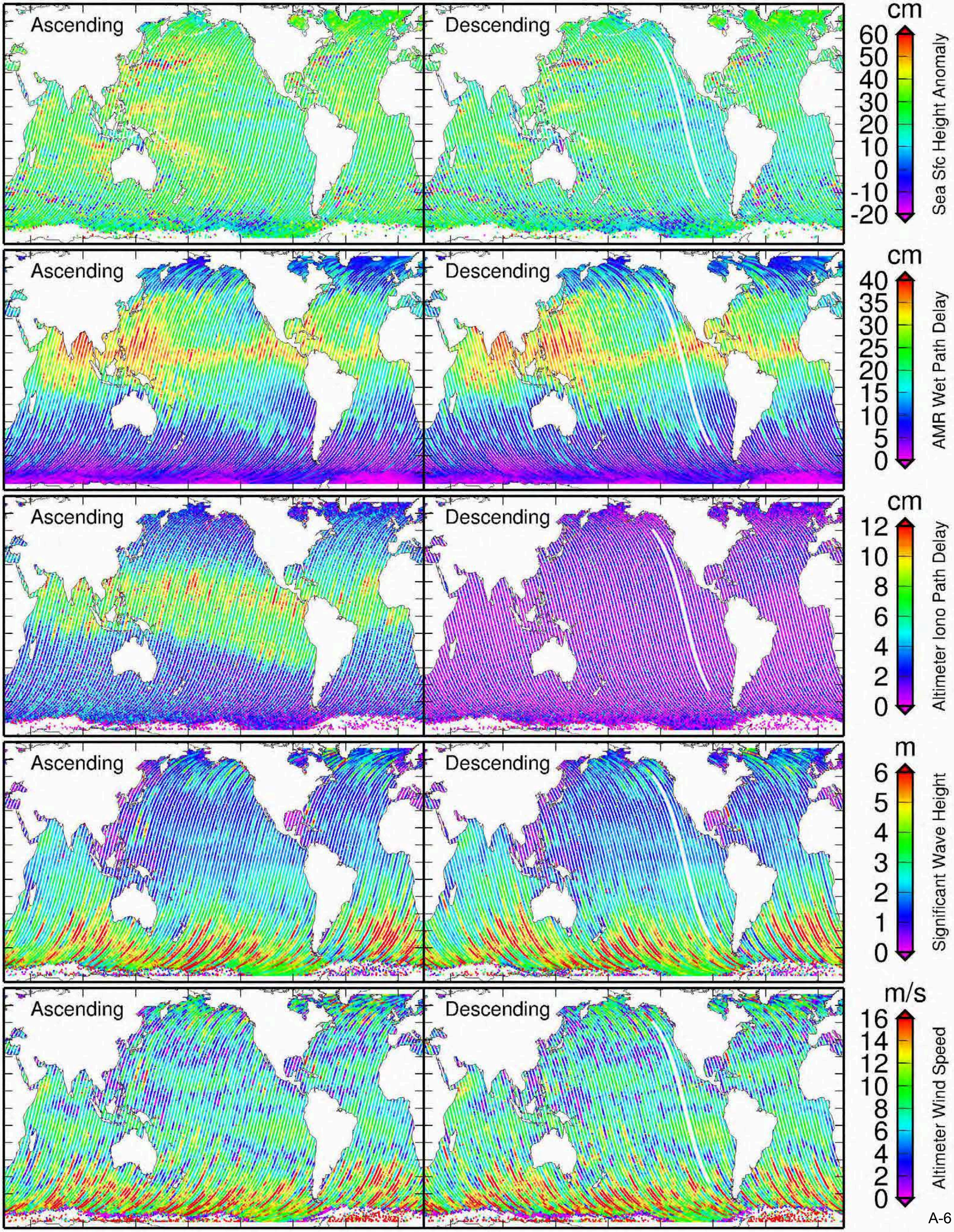


Jason-2 Cycle-113 2011-07-27 14:34:59 - 2011-08-06 12:33:30

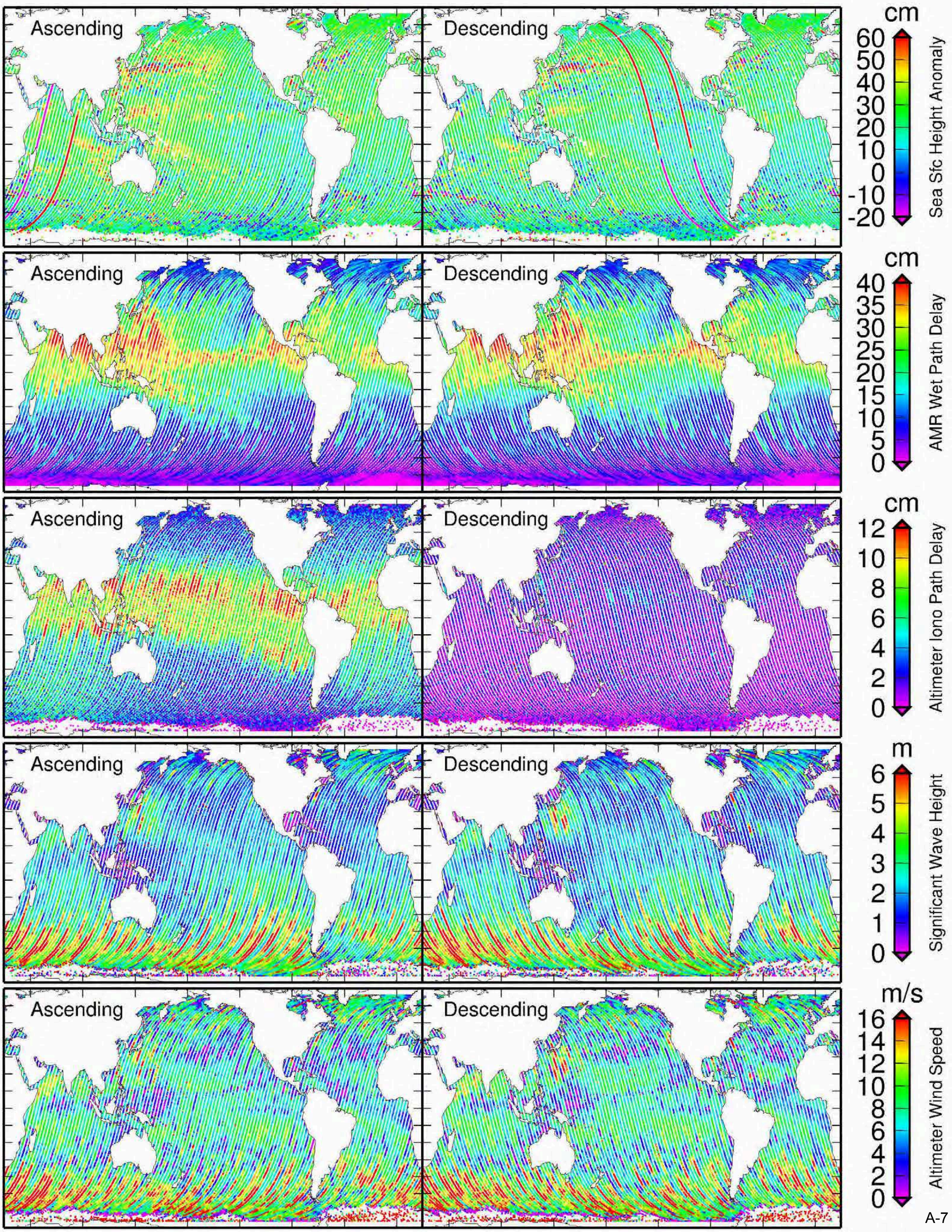



Jason-2 Cycle-114 2011-08-06 12:33:30 - 2011-08-16 10:32:02
Ascending
Descending
cm
60 50 40 30 20 10 0 -10 -20
Sea Sfc Height Anomaly
Ascending
Descending
cm
40 35 30 25 20 15 10 5 0
AMR Wet Path Delay
Ascending
Descending
cm
12 10 8 6 4 2 0
Altimeter Iono Path Delay
Ascending
Descending
m
6 5 4 3 2 1 0
Significant Wave Height
Ascending
Descending
m/s
16 14 12 10 8 6 4 2 0
Altimeter Wind Speed

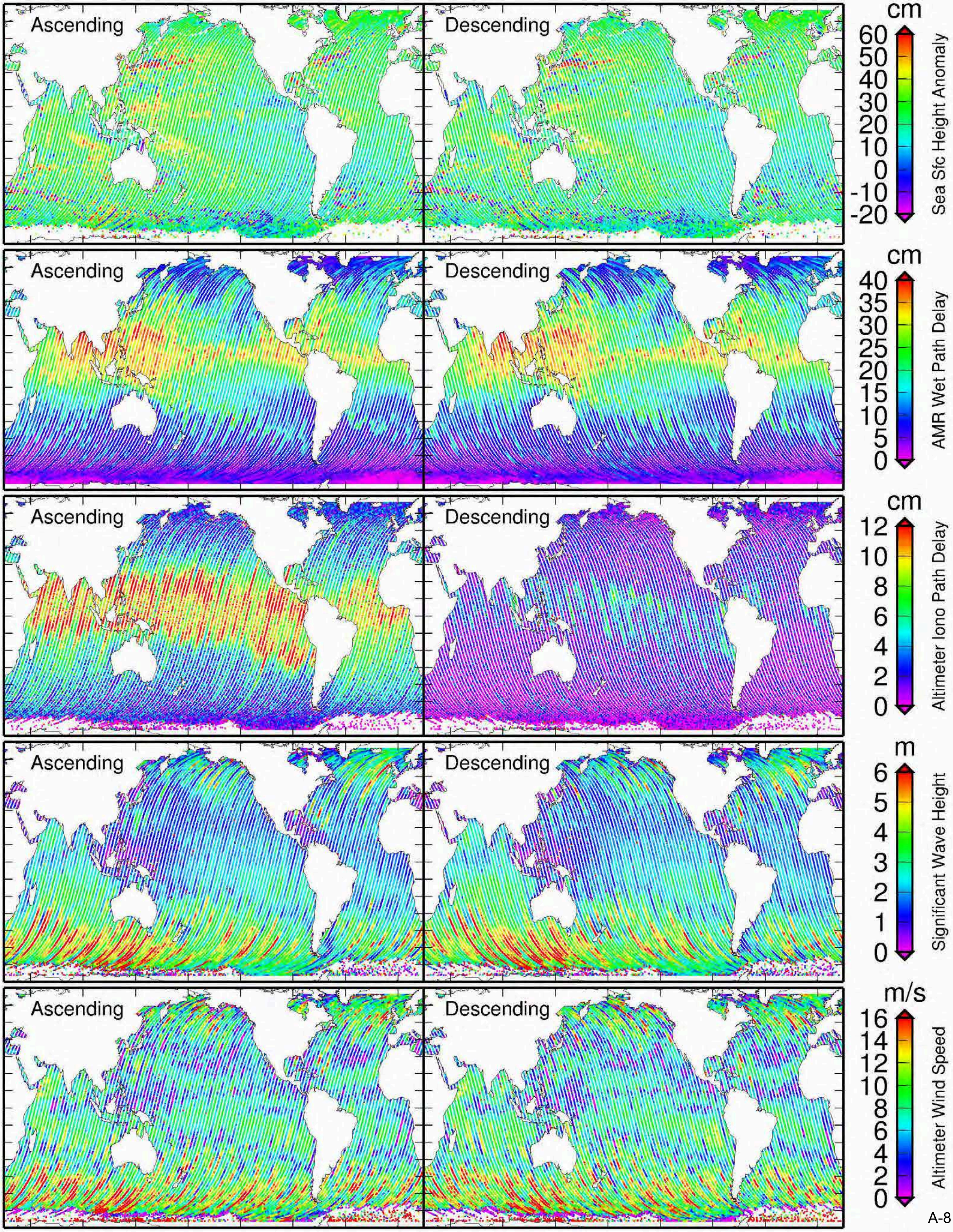
Jason-2 Cycle-115 2011-08-16 10:32:02 - 2011-08-26 08:30:34



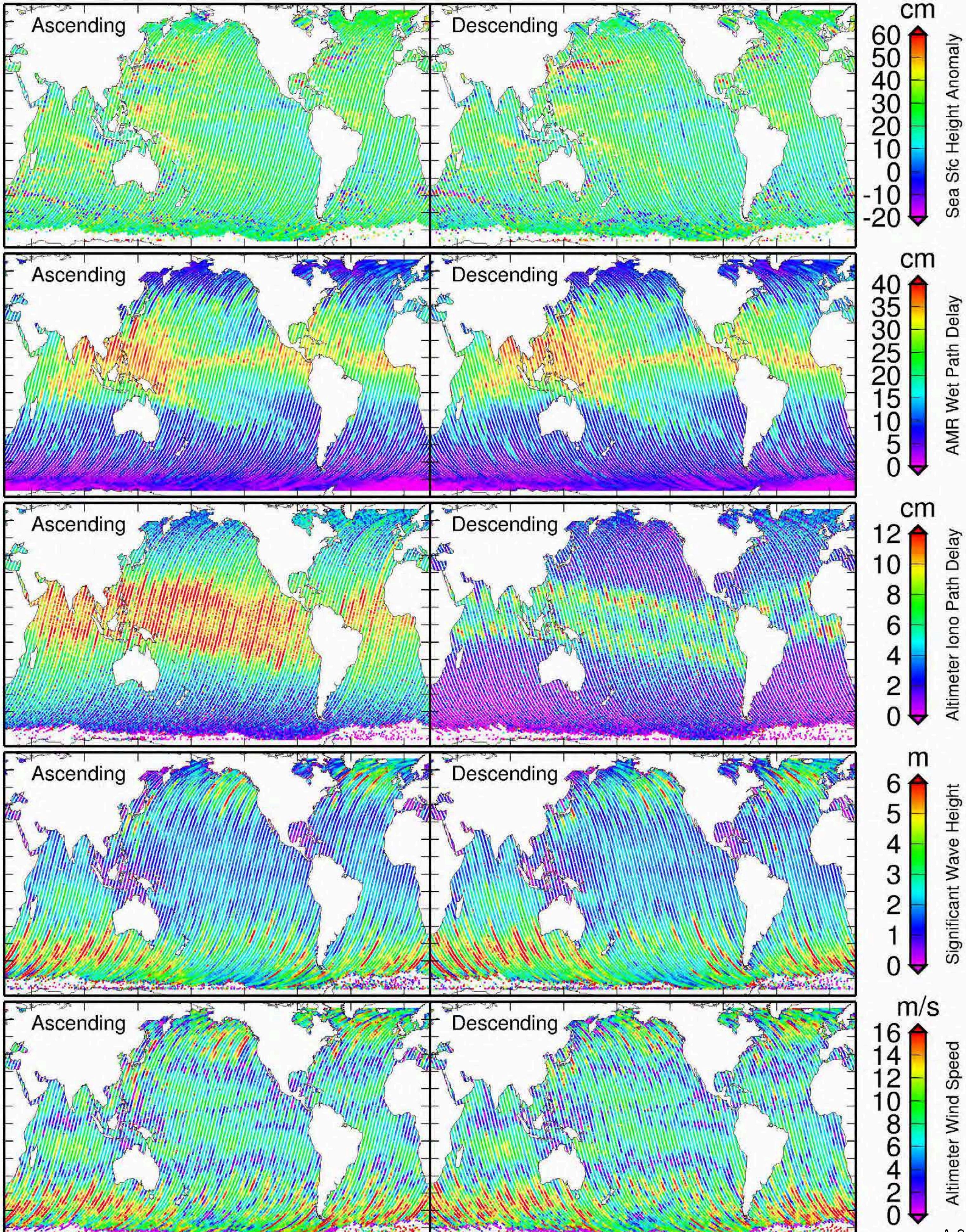
Jason-2 Cycle-116 2011-08-26 08:30:34 - 2011-09-05 06:29:05



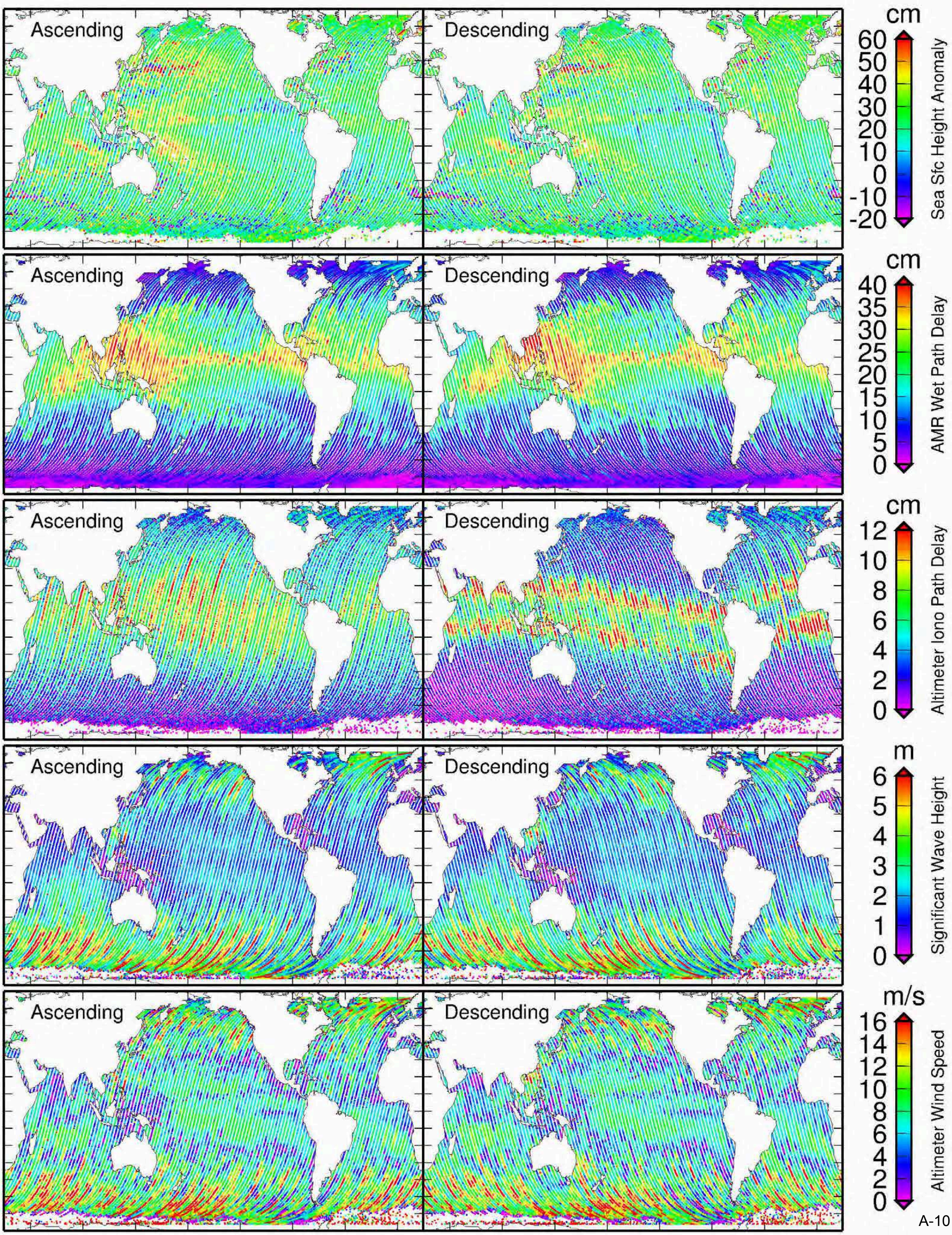
Jason-2 Cycle-117 2011-09-05 06:29:05 - 2011-09-15 04:27:37



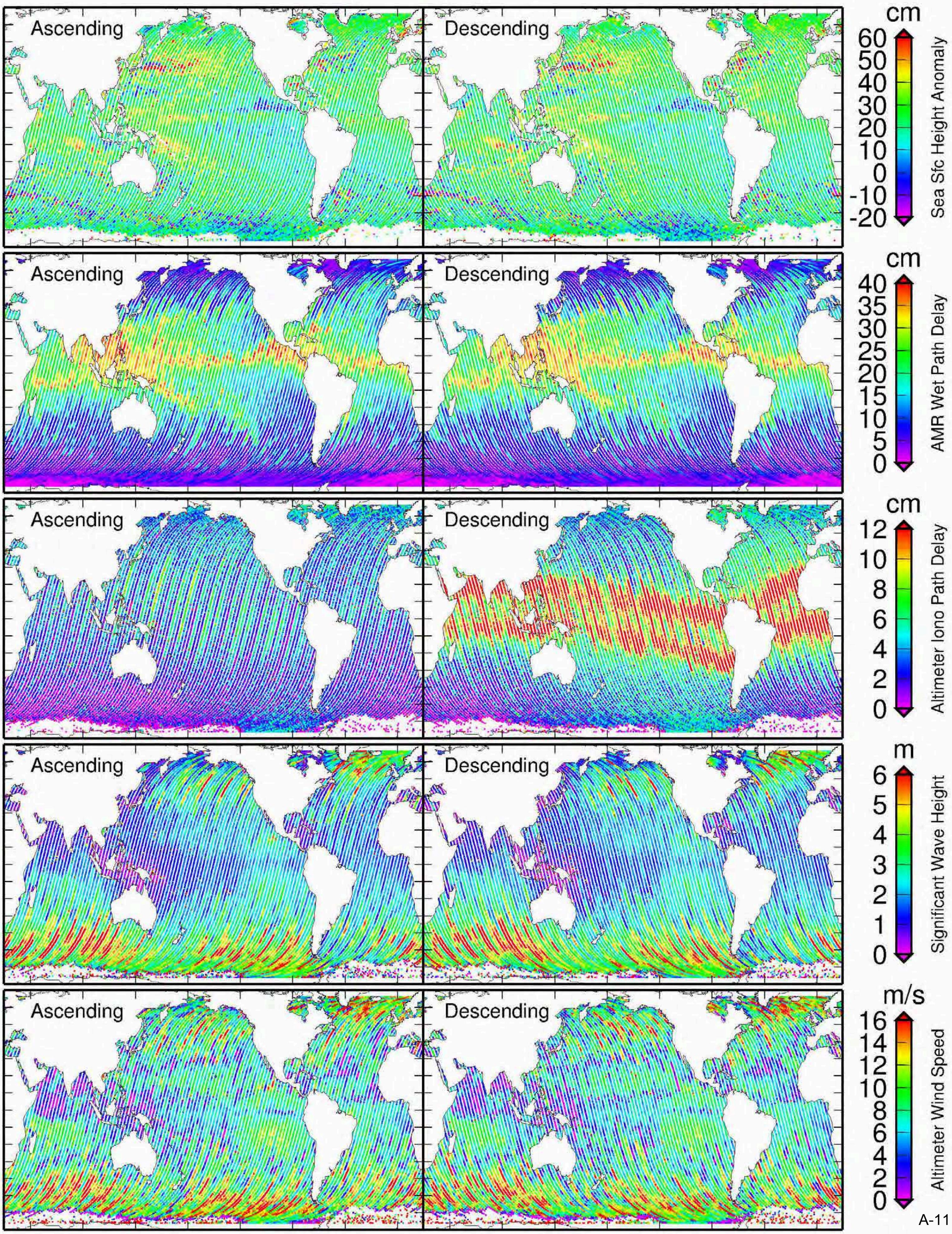
Jason-2 Cycle-118 2011-09-15 04:27:37 - 2011-09-25 02:26:08



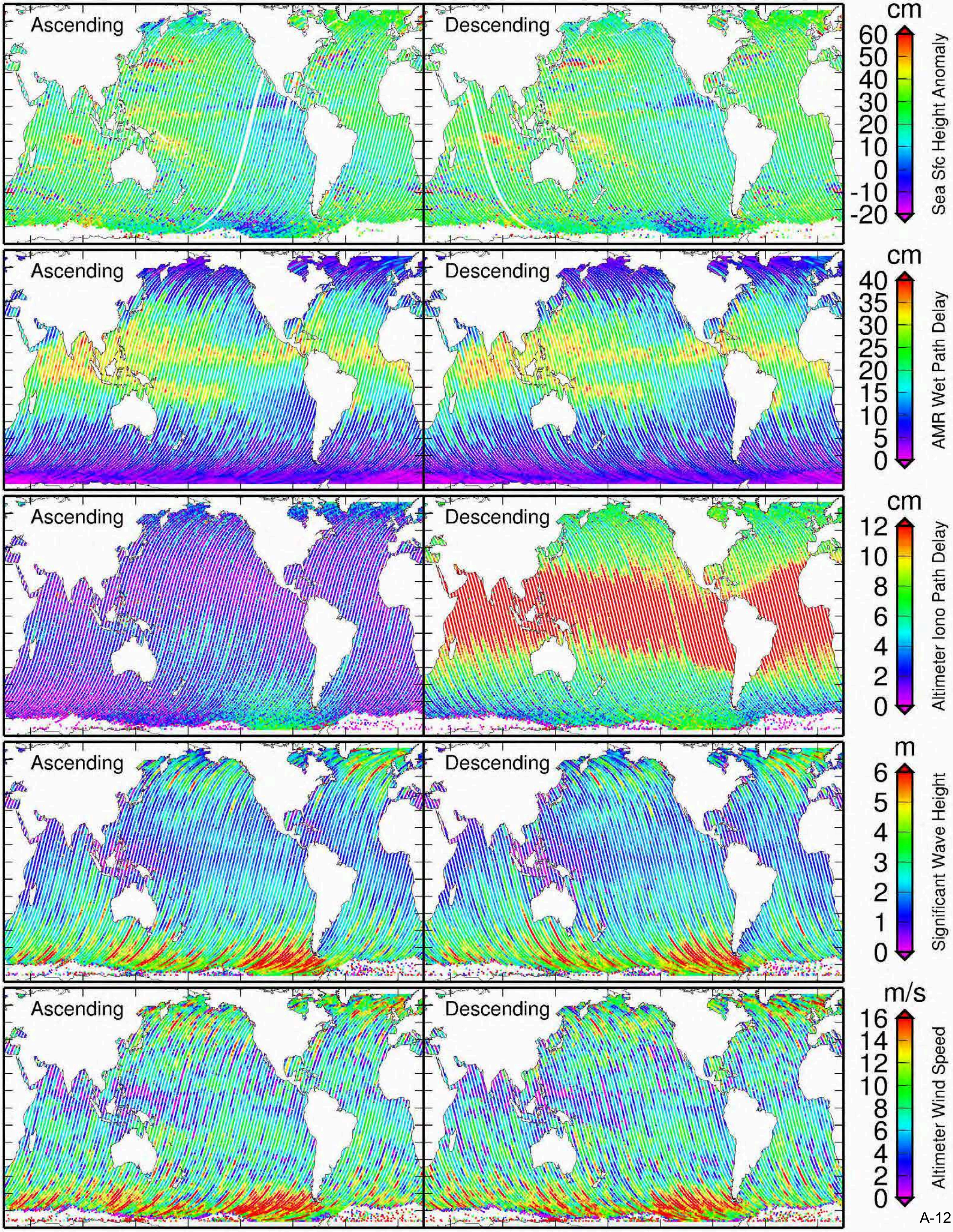
Jason-2 Cycle-119 2011-09-25 02:26:08 - 2011-10-05 00:24:40



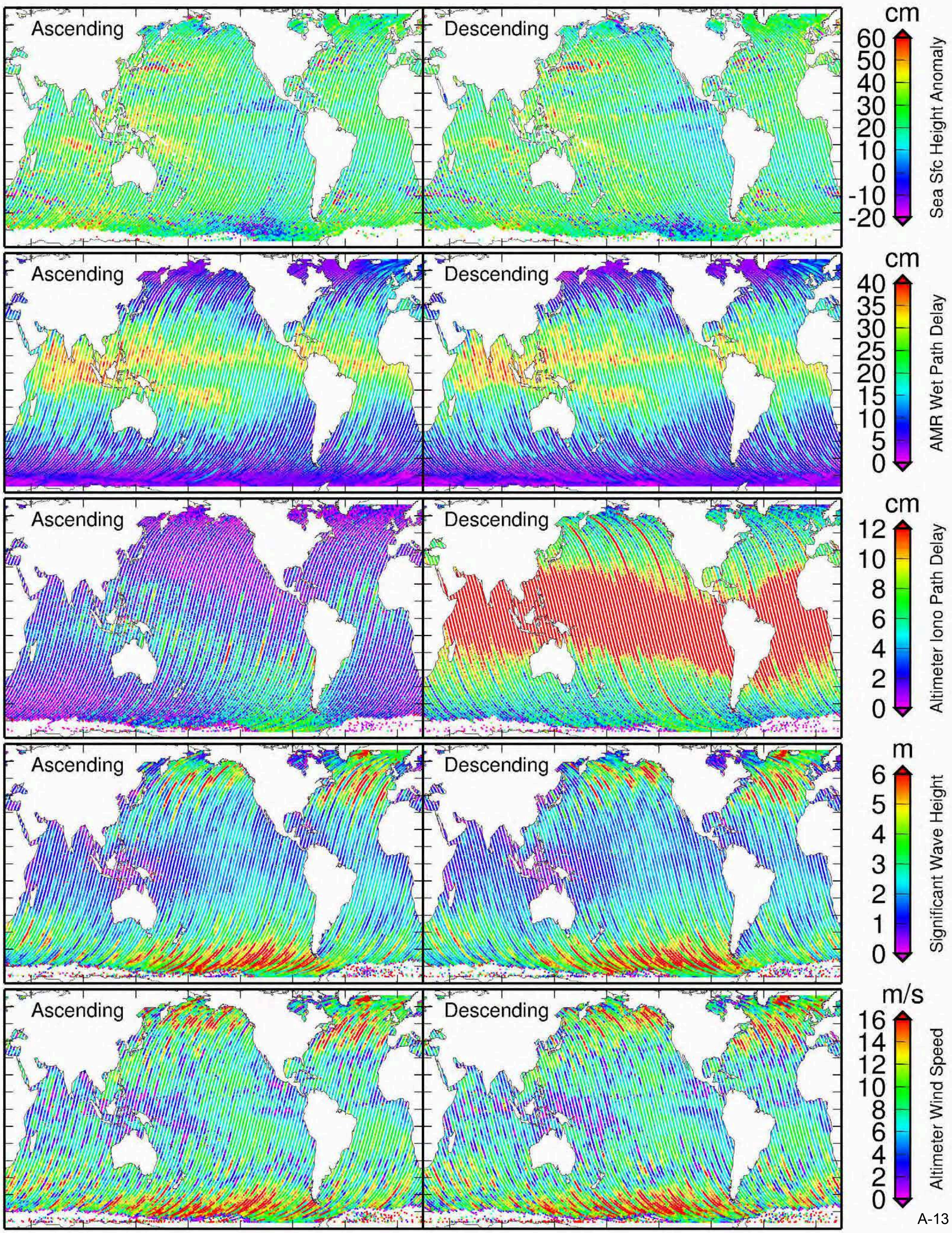
Jason-2 Cycle-120 2011-10-05 00:24:40 - 2011-10-14 22:23:12



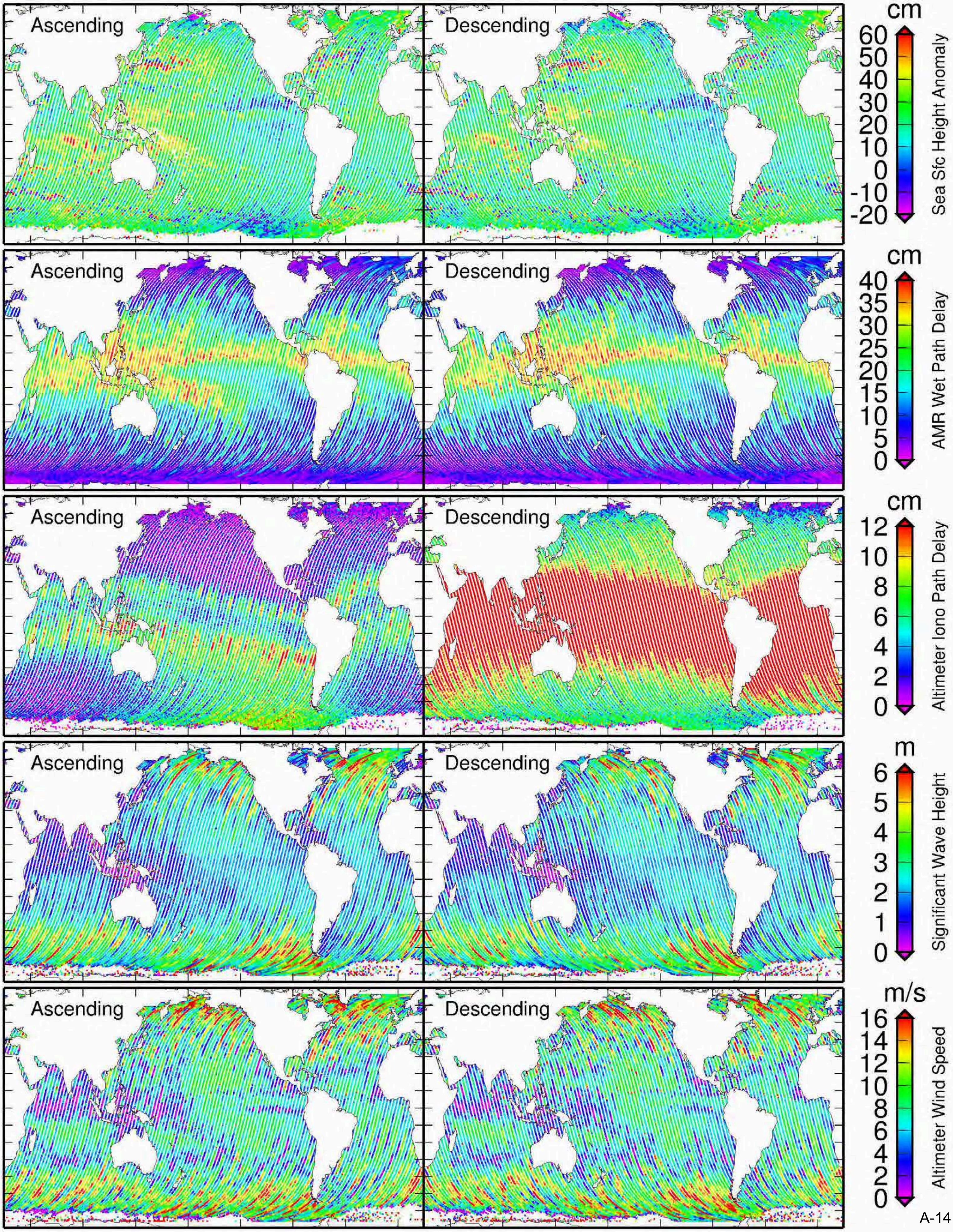
Jason-2 Cycle-121 2011-10-14 22:23:12 - 2011-10-24 20:21:43



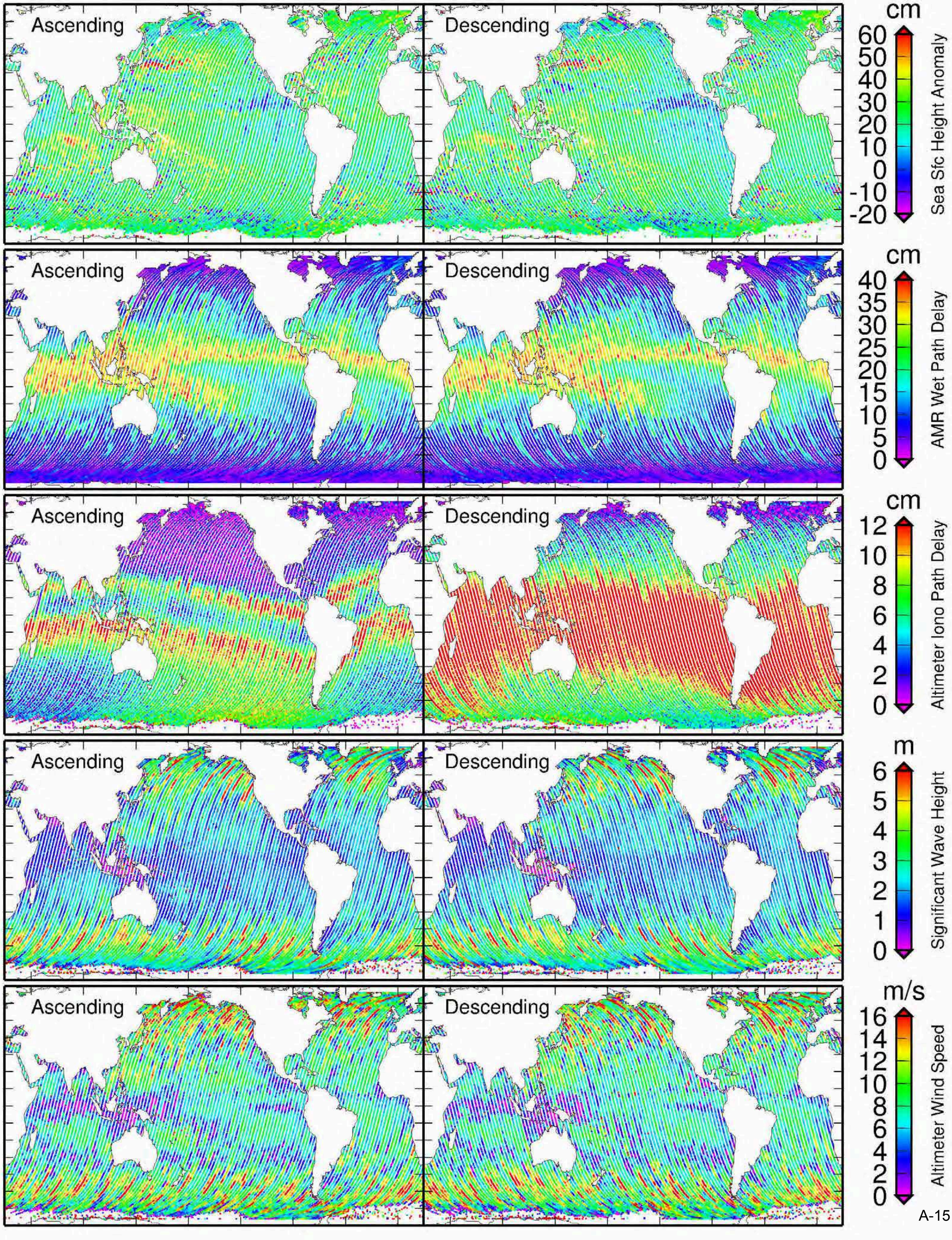
Jason-2 Cycle-122 2011-10-24 20:21:43 - 2011-11-03 18:20:15

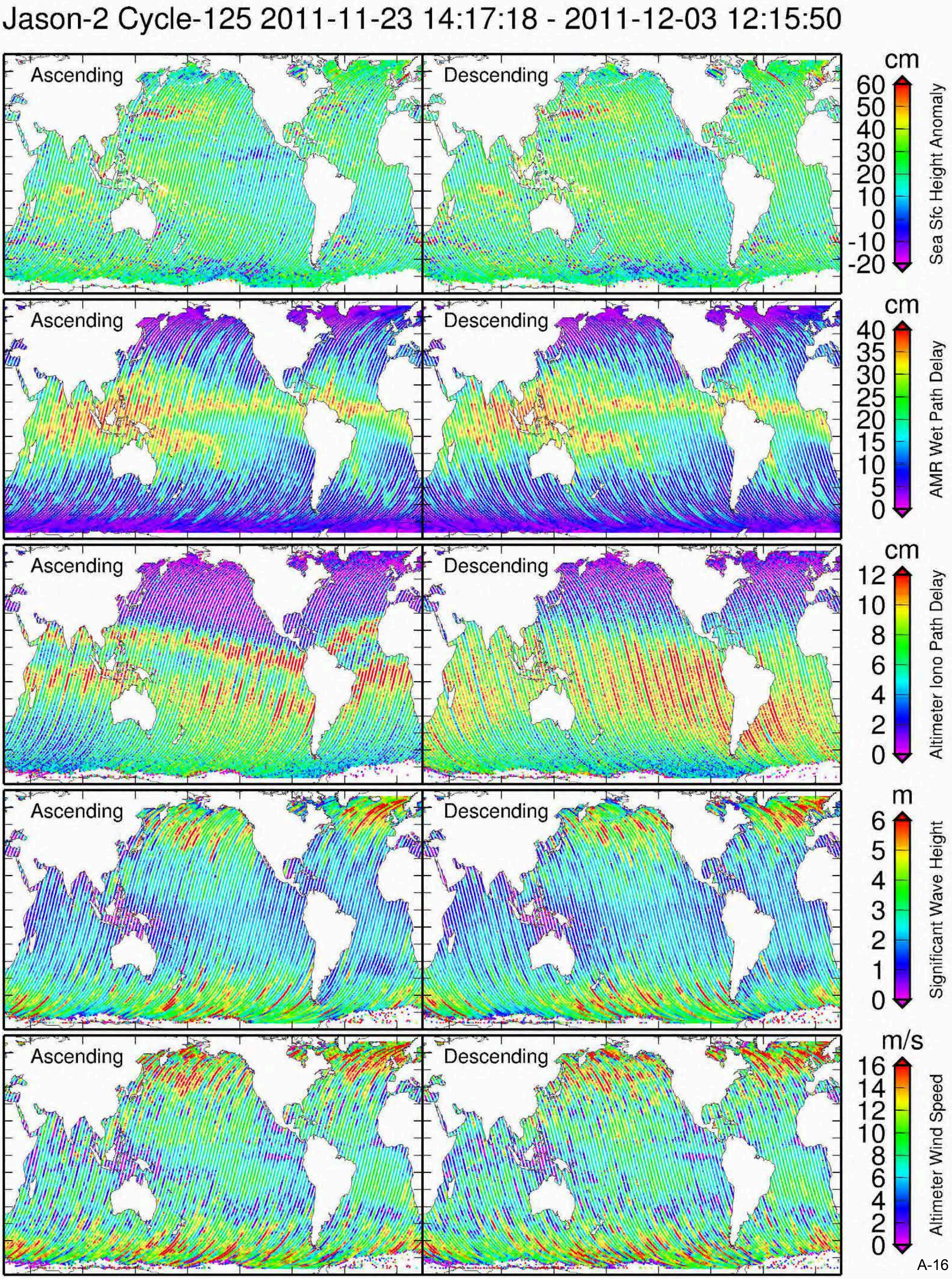


Jason-2 Cycle-123 2011-11-03 18:20:15 - 2011-11-13 16:18:46

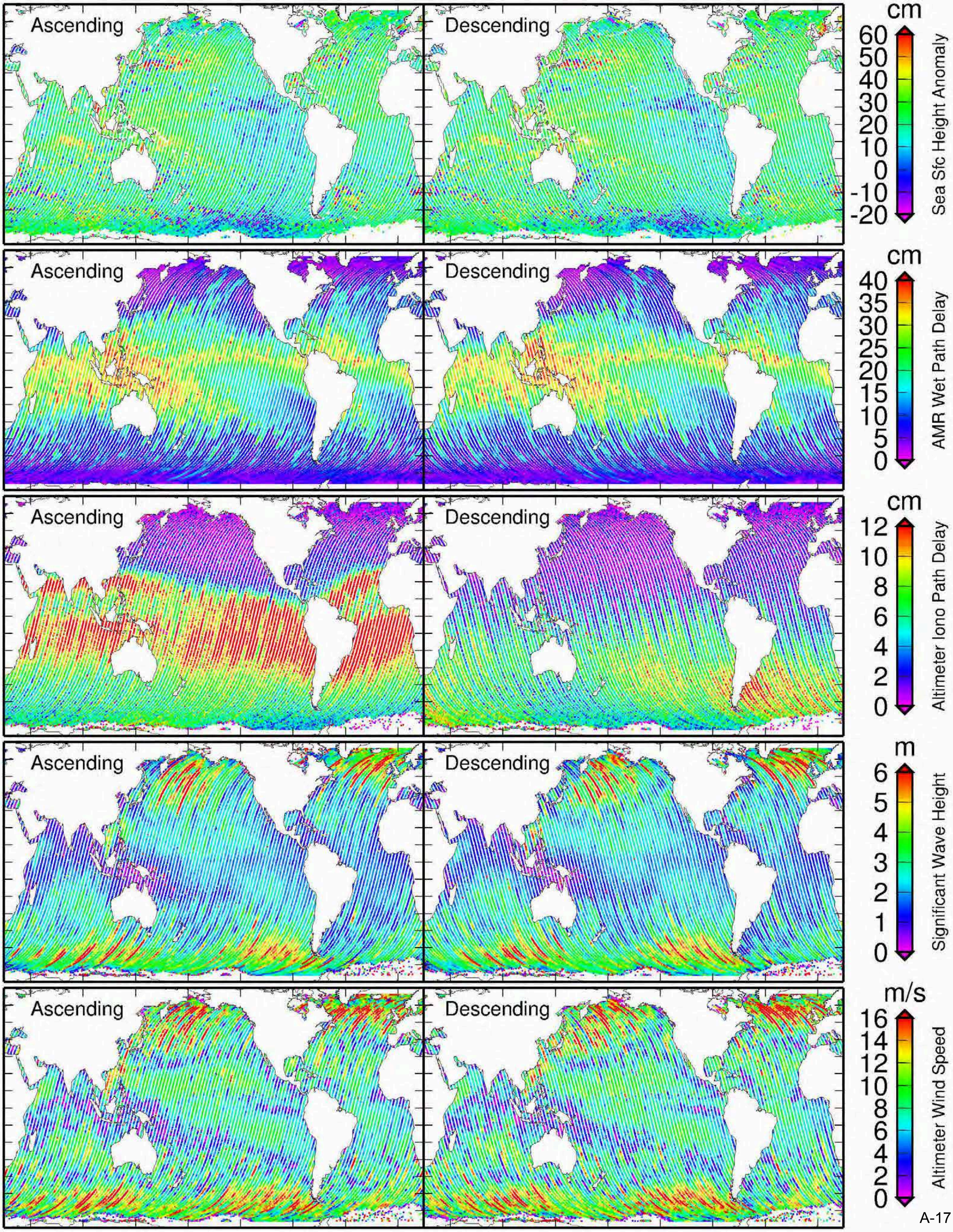


Jason-2 Cycle-124 2011-11-13 16:18:46 - 2011-11-23 14:17:18

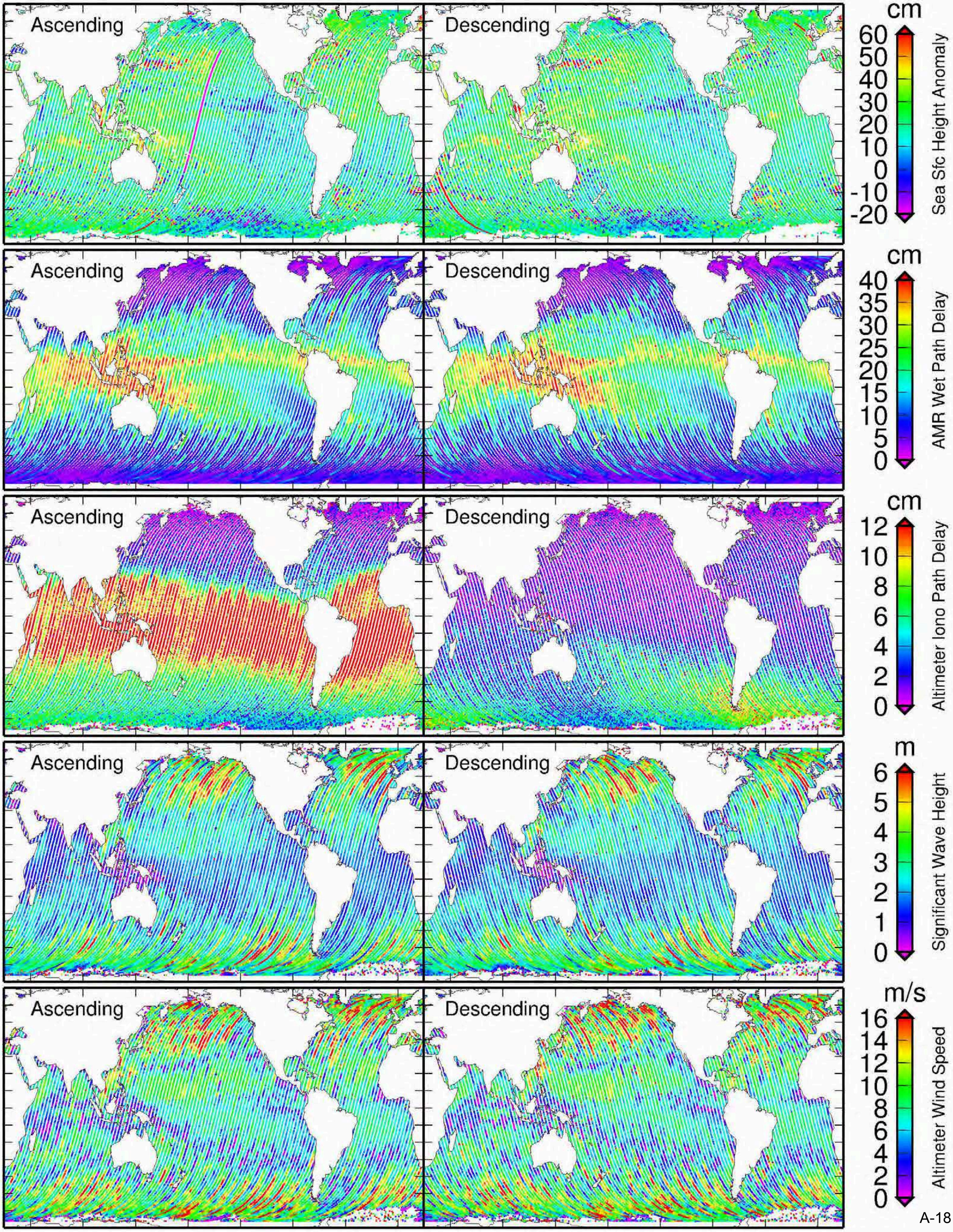



Jason-2 Cycle-125 2011-11-23 14:17:18 - 2011-12-03 12:15:50
Ascending
Descending
cm
60
50
40
30
20
10
0
-10
-20
Sea Sfc Height Anomaly
Ascending
Descending
cm
40
35
30
25
20
15
10
5
0
AMR Wet Path Delay
Ascending
Descending
cm
12
10
8
6
4
2
0
Altimeter Iono Path Delay
Ascending
Descending
m
6
5
4
3
2
1
0
Significant Wave Height
Ascending
Descending
m/s
16
14
12
10
8
6
4
2
0
Altimeter Wind Speed

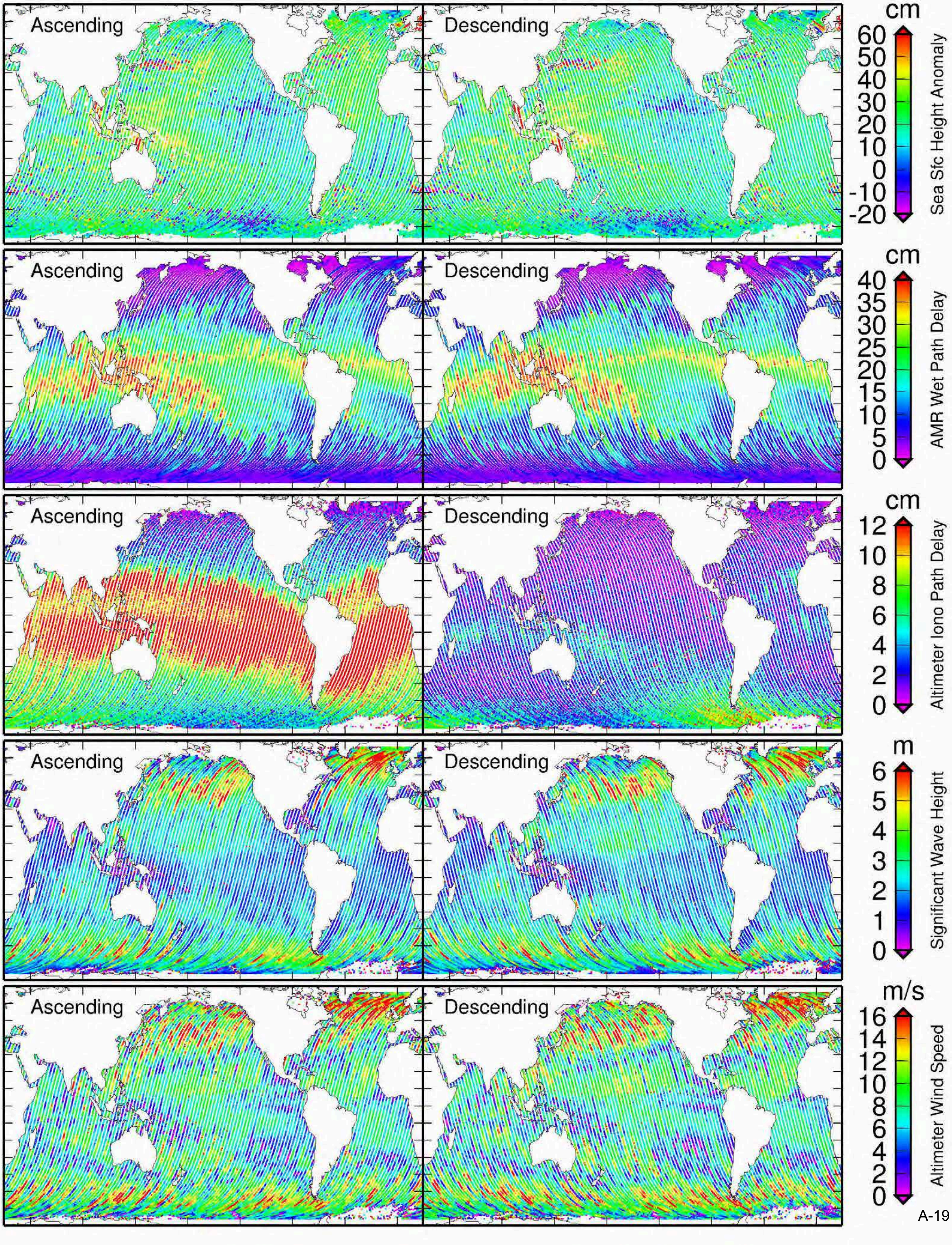
Jason-2 Cycle-126 2011-12-03 12:15:50 - 2011-12-13 10:14:21



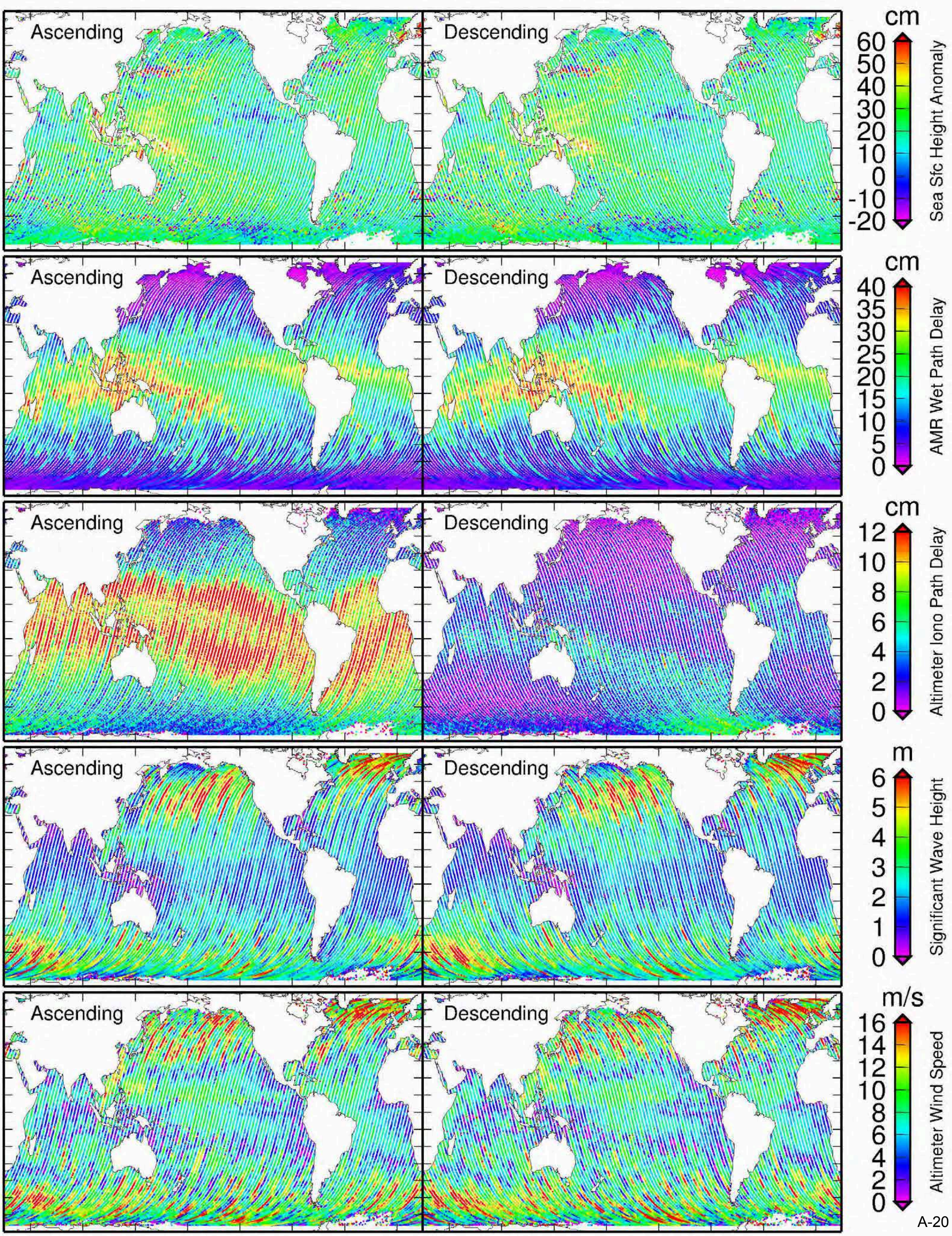
Jason-2 Cycle-127 2011-12-13 10:14:21 - 2011-12-23 08:12:53



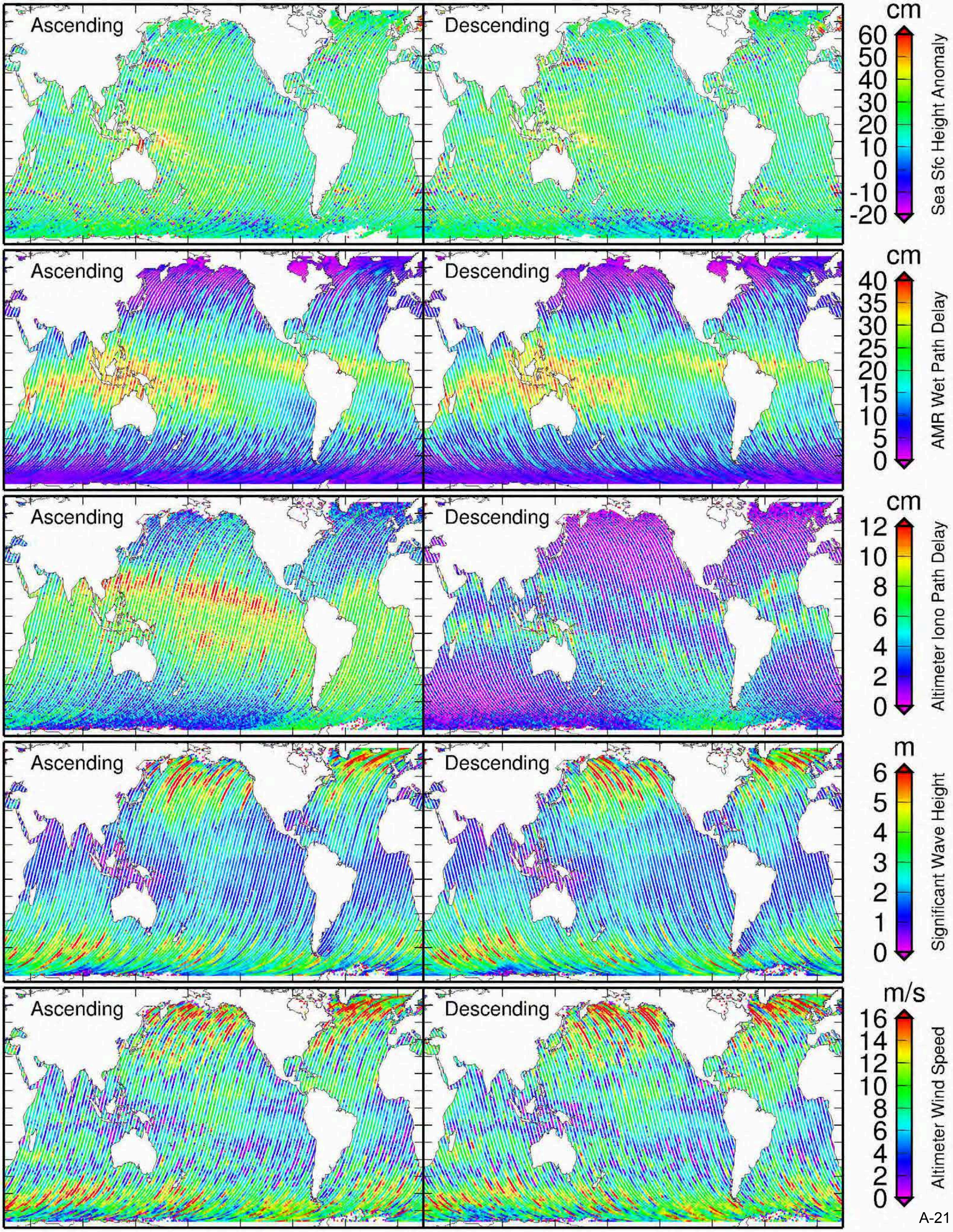
Jason-2 Cycle-128 2011-12-23 08:12:53 - 2012-01-02 06:11:25



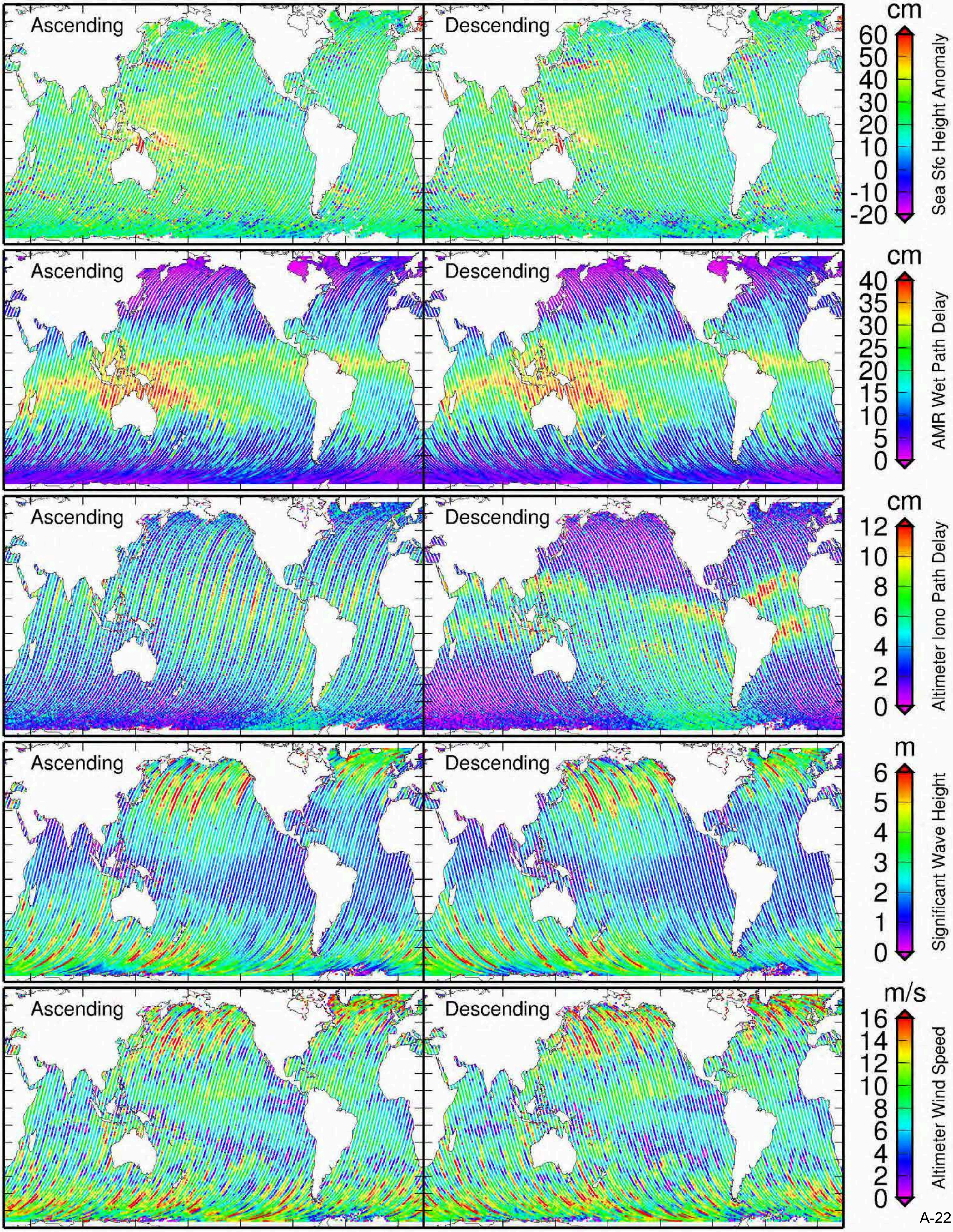
Jason-2 Cycle-129 2012-01-02 06:11:25 - 2012-01-12 04:09:56



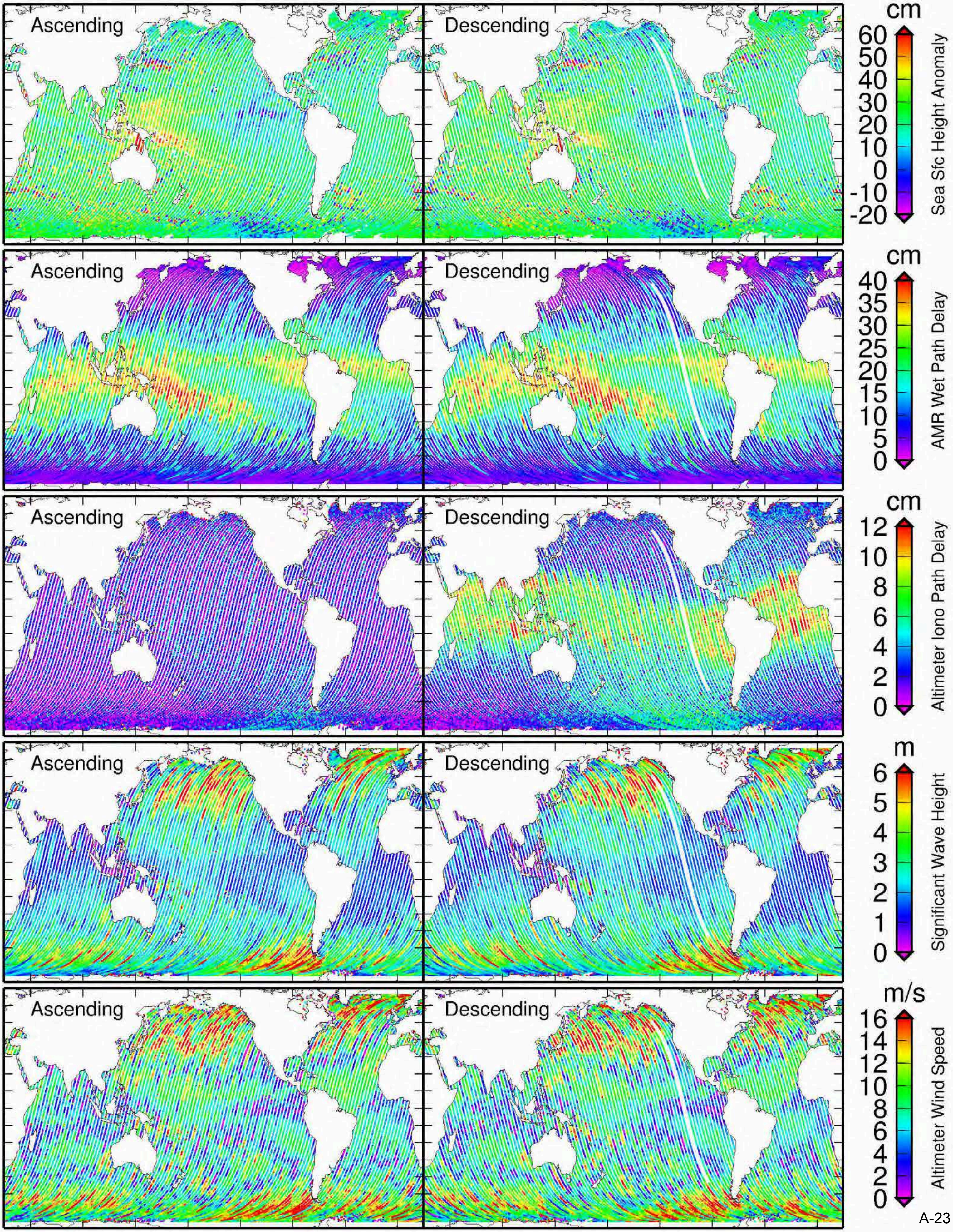
Jason-2 Cycle-130 2012-01-12 04:09:56 - 2012-01-22 02:08:28



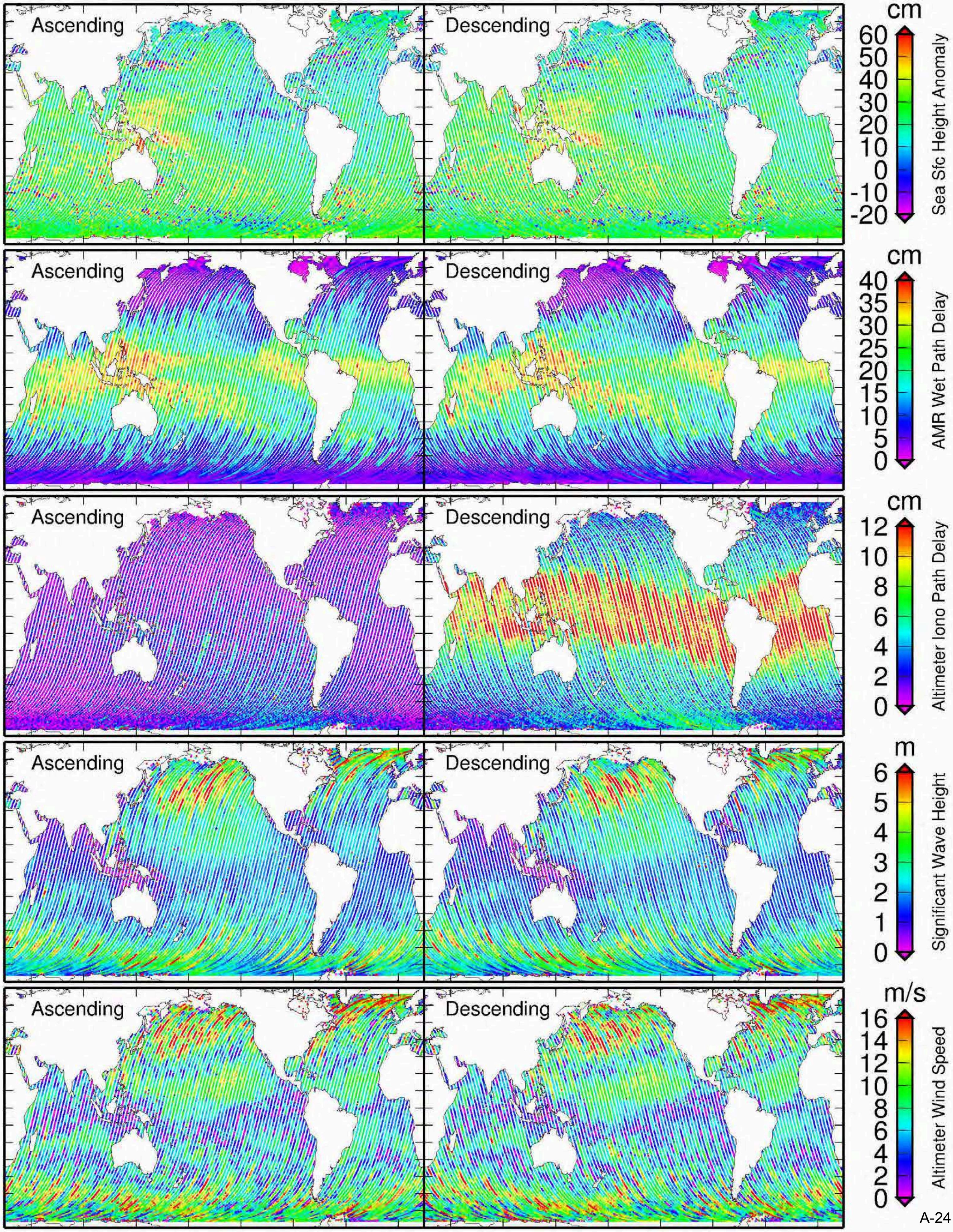
Jason-2 Cycle-131 2012-01-22 02:08:28 - 2012-02-01 00:06:59



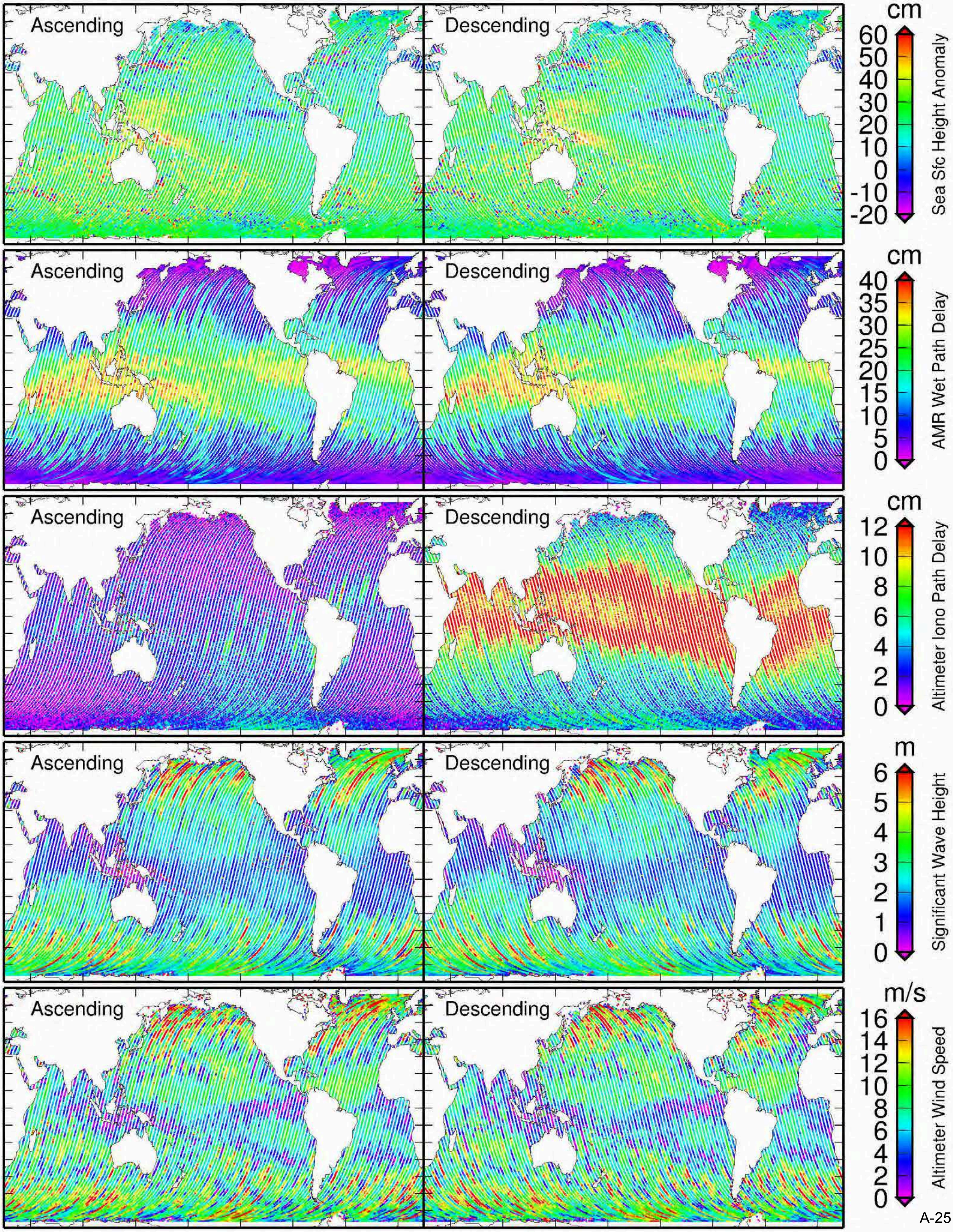
Jason-2 Cycle-132 2012-02-01 00:06:59 - 2012-02-10 22:05:31



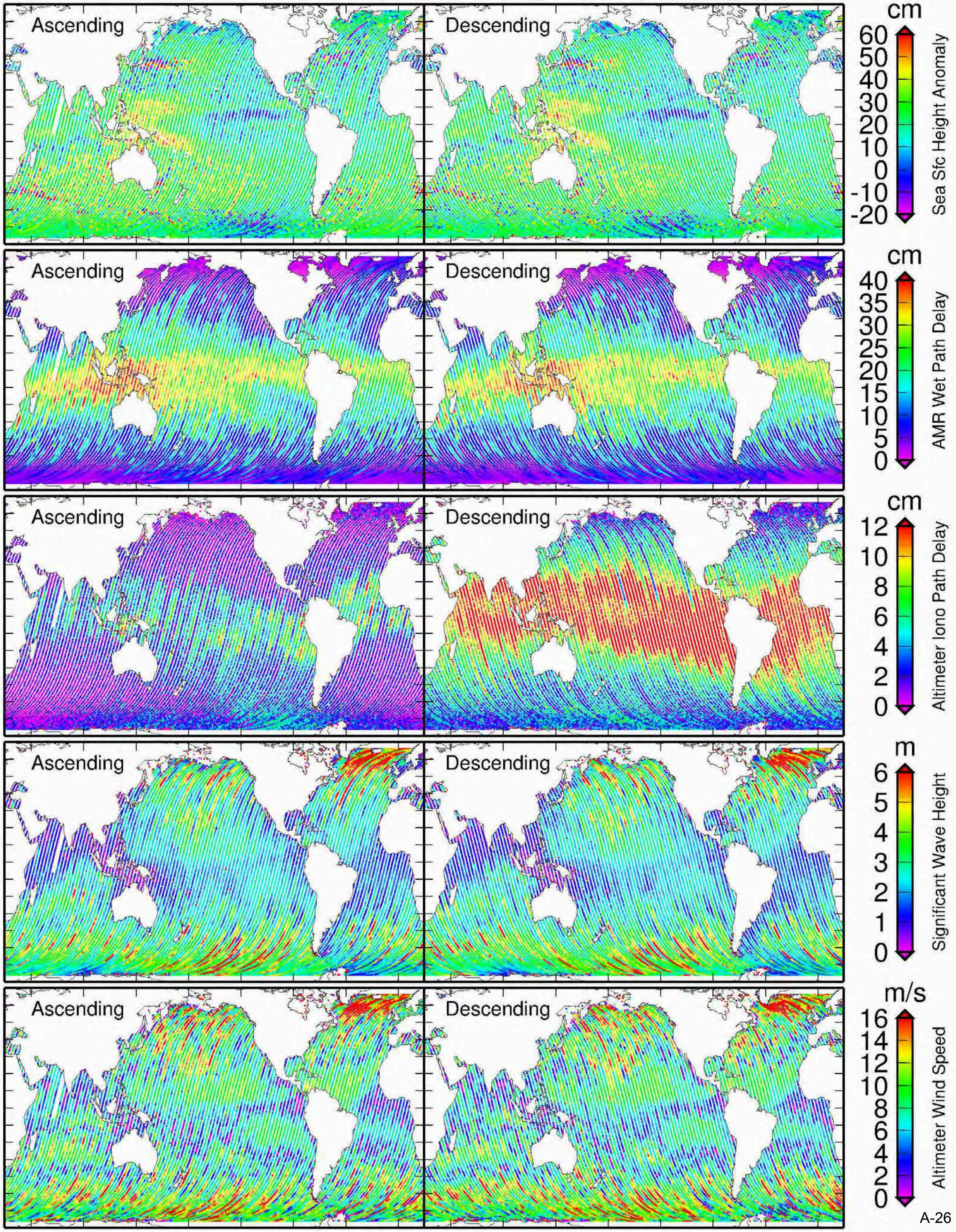
Jason-2 Cycle-133 2012-02-10 22:05:31 - 2012-02-20 20:04:03



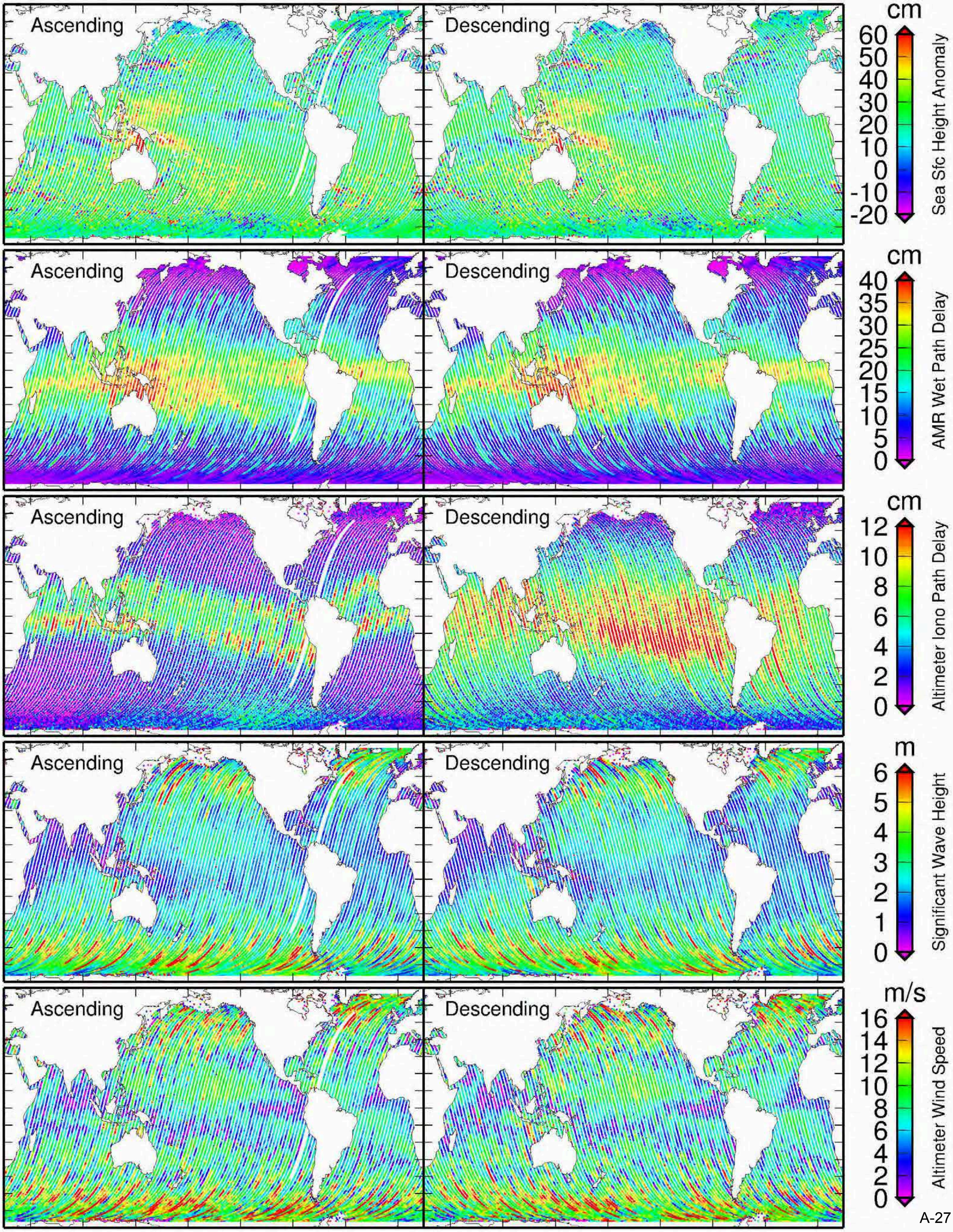
Jason-2 Cycle-134 2012-02-20 20:04:03 - 2012-03-01 18:02:34



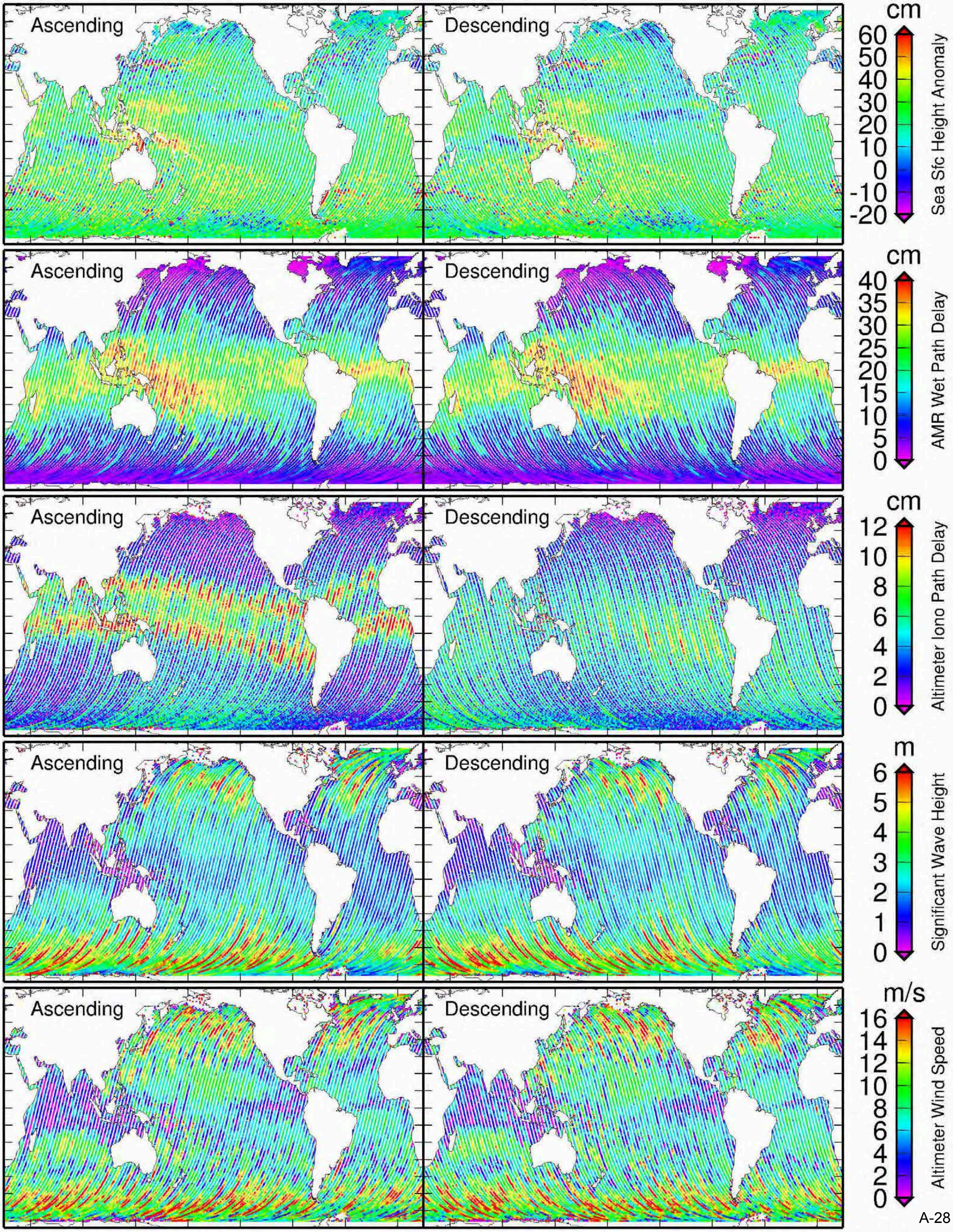
Jason-2 Cycle-135 2012-03-01 18:02:34 - 2012-03-11 16:01:06



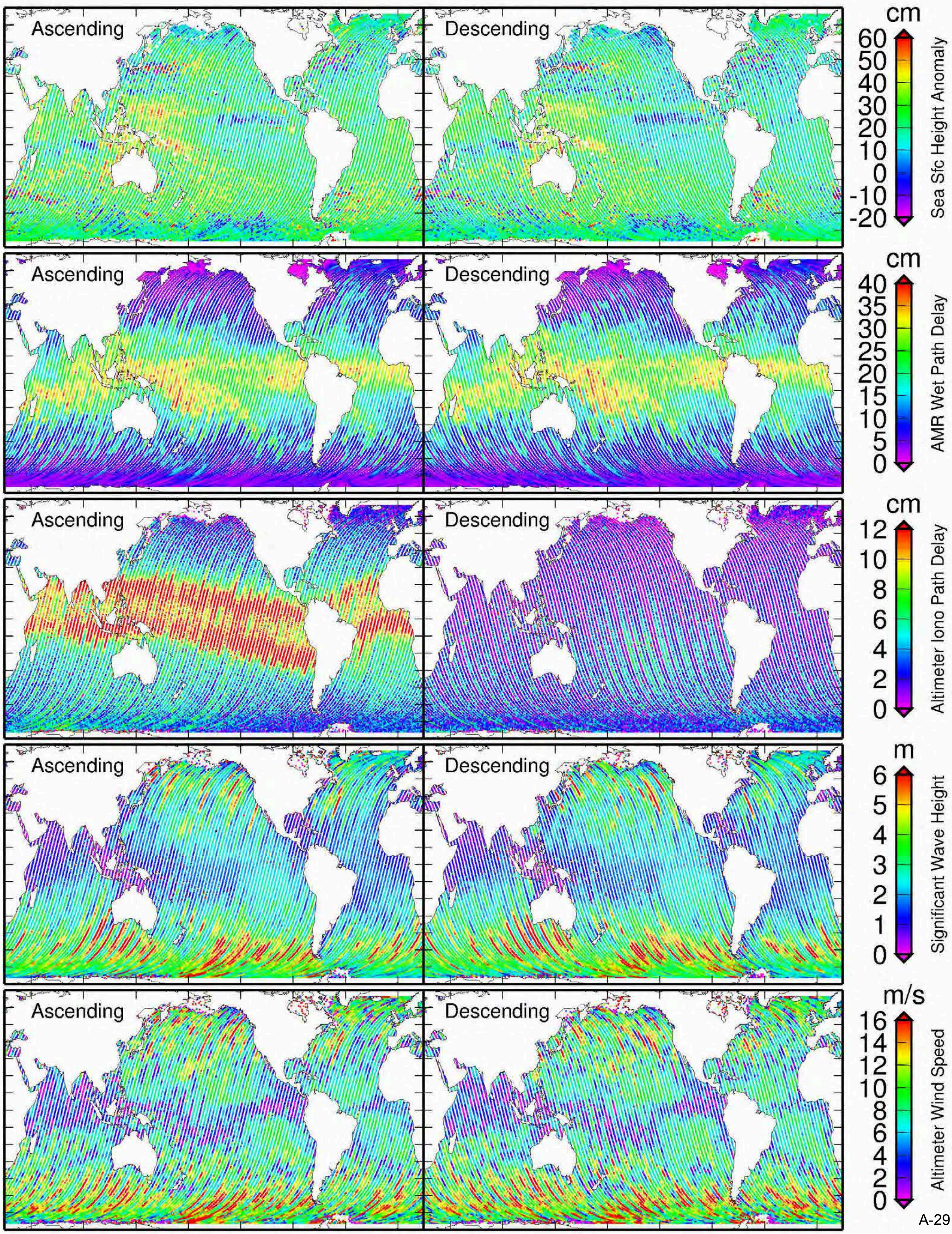
Jason-2 Cycle-136 2012-03-11 16:01:06 - 2012-03-21 13:59:37



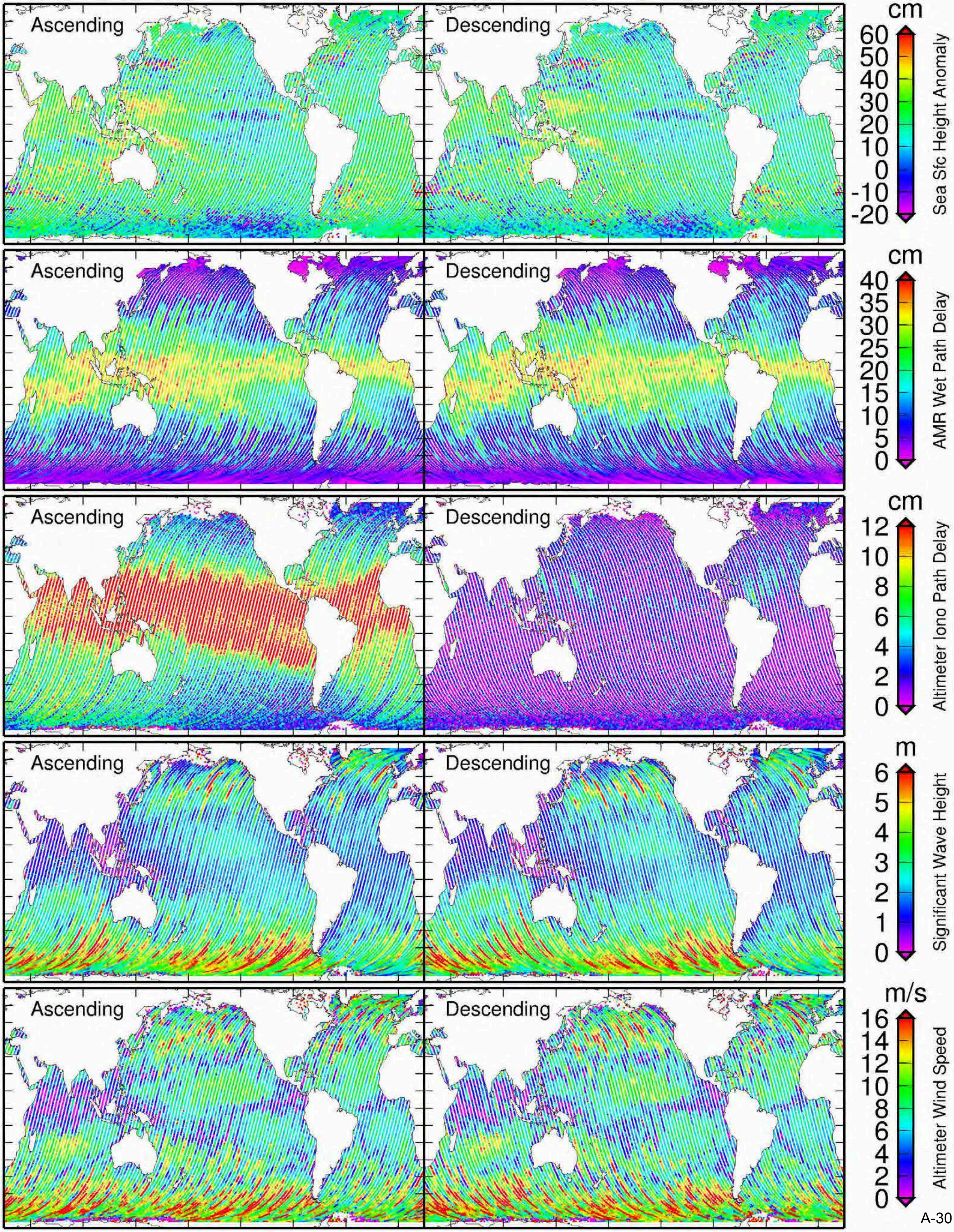
Jason-2 Cycle-137 2012-03-21 13:59:37 - 2012-03-31 11:58:09



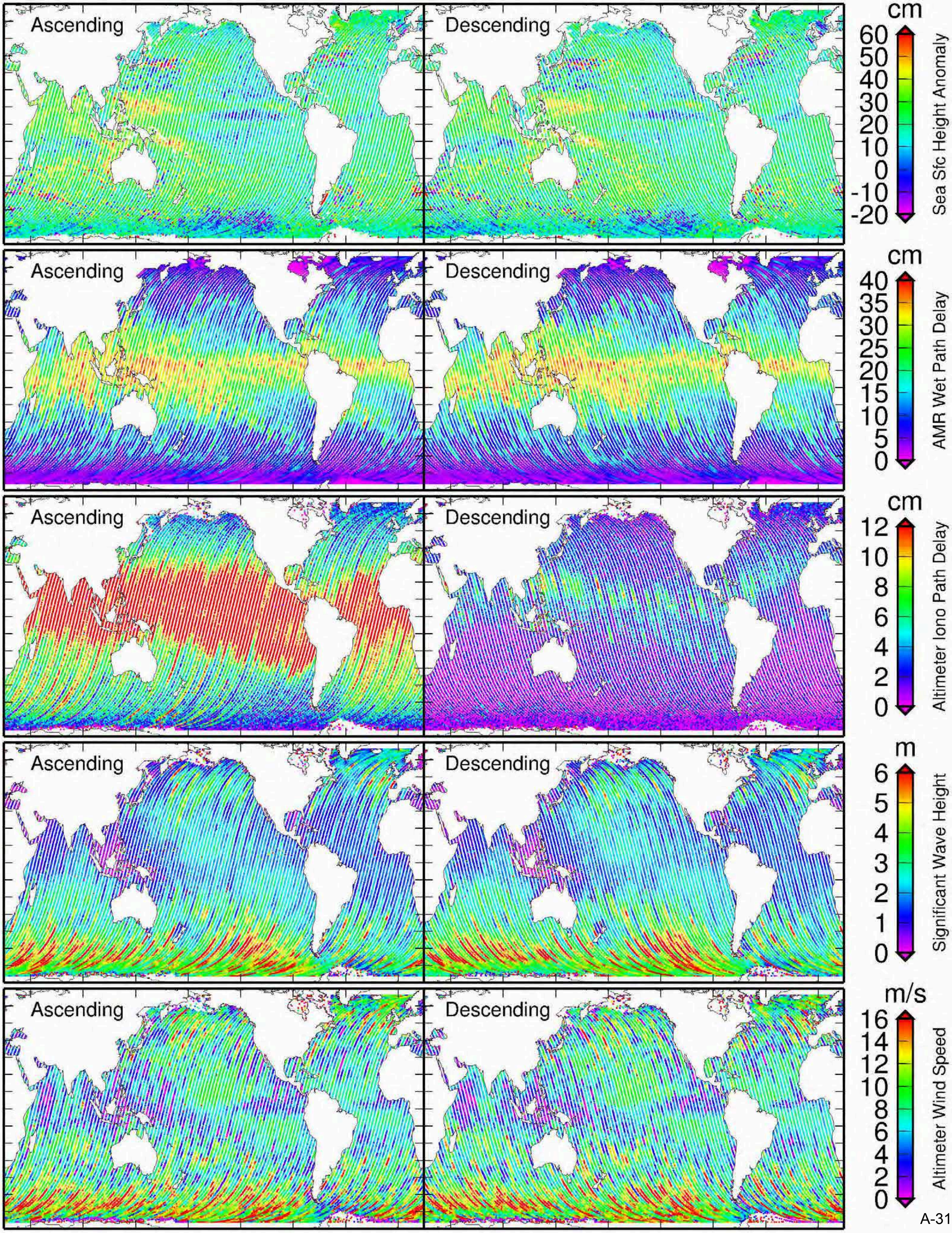
Jason-2 Cycle-138 2012-03-31 11:58:09 - 2012-04-10 09:56:41



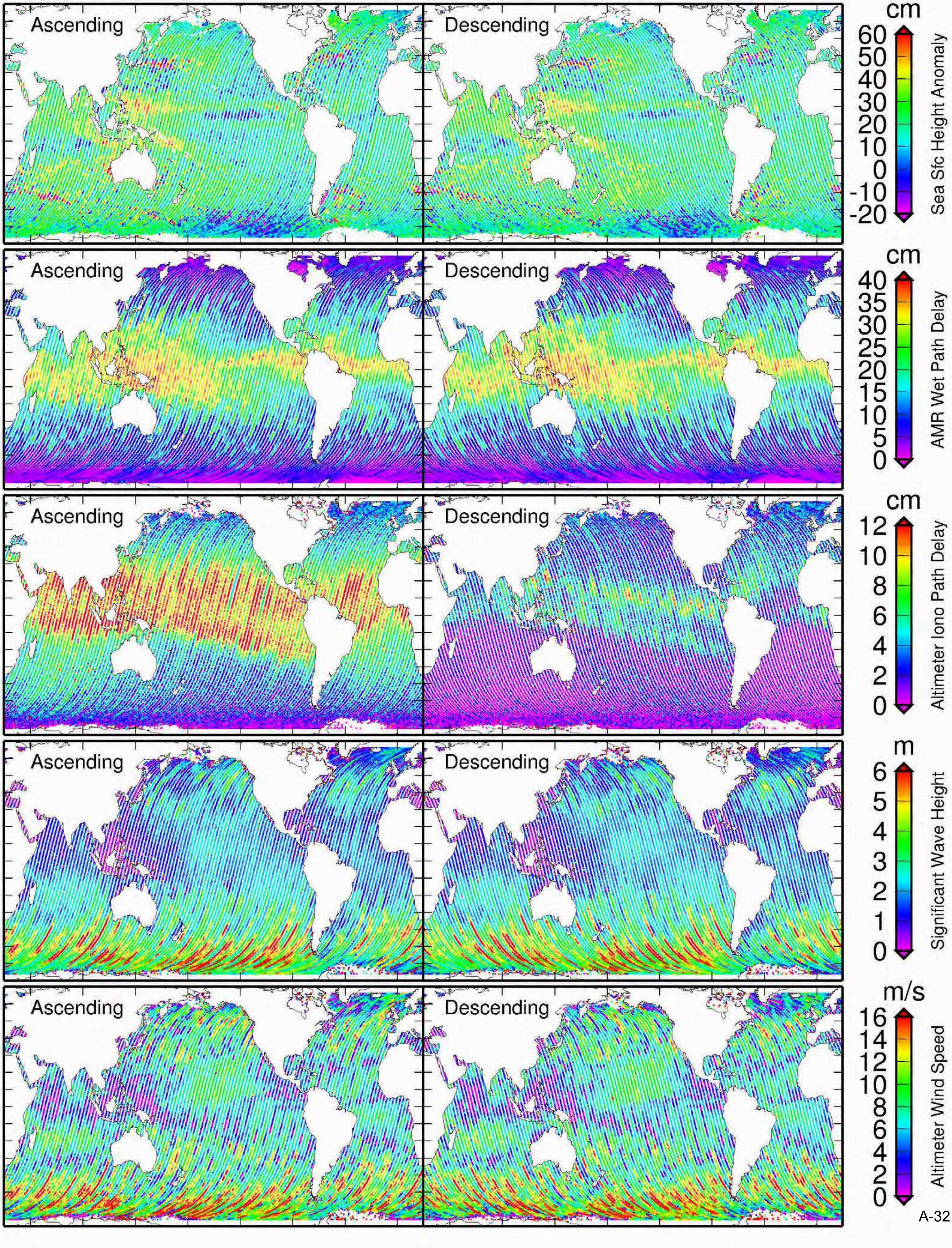
Jason-2 Cycle-139 2012-04-10 09:56:41 - 2012-04-20 07:55:12



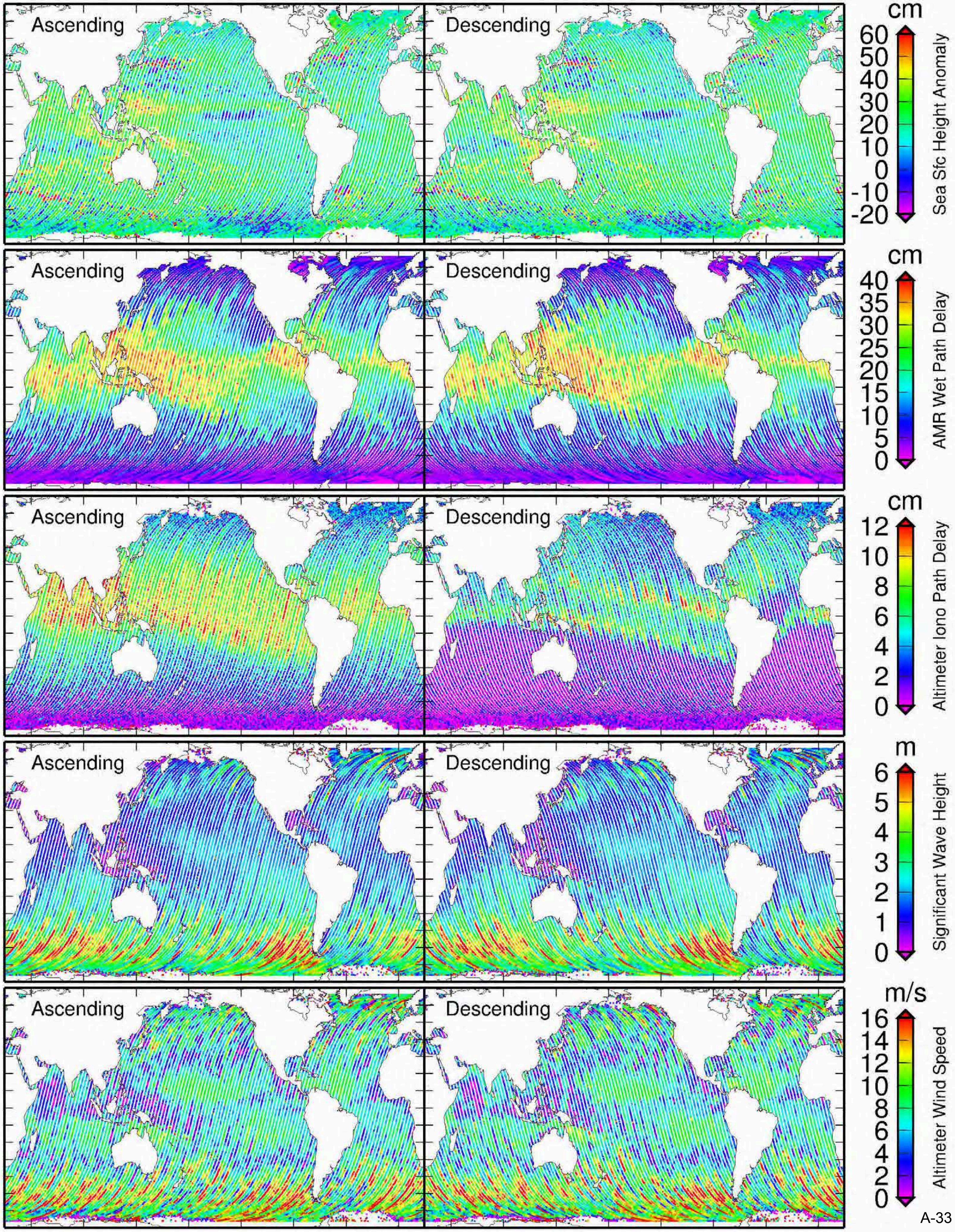
Jason-2 Cycle-140 2012-04-20 07:55:12 - 2012-04-30 05:53:44



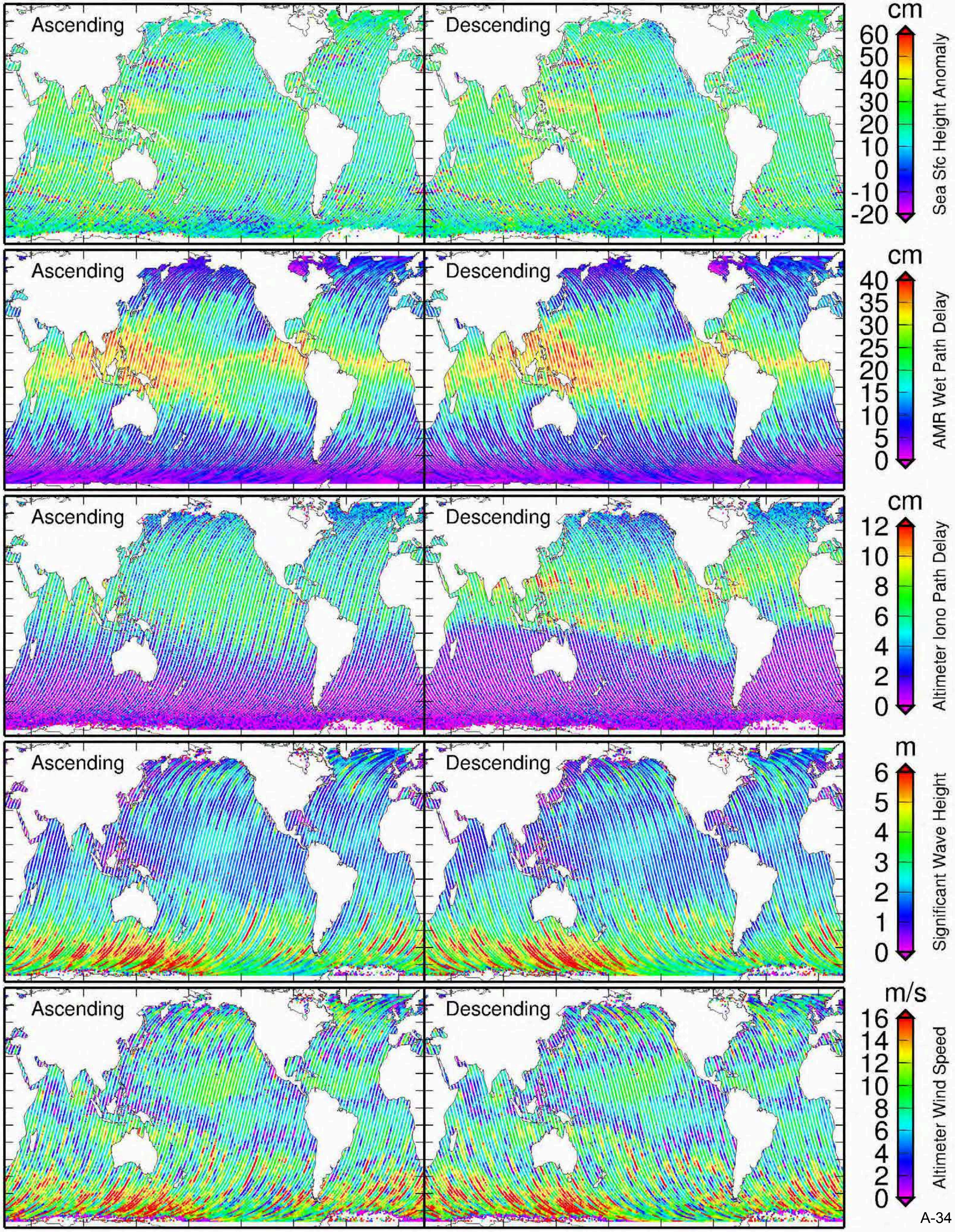
Jason-2 Cycle-141 2012-04-30 05:53:44 - 2012-05-10 03:52:16



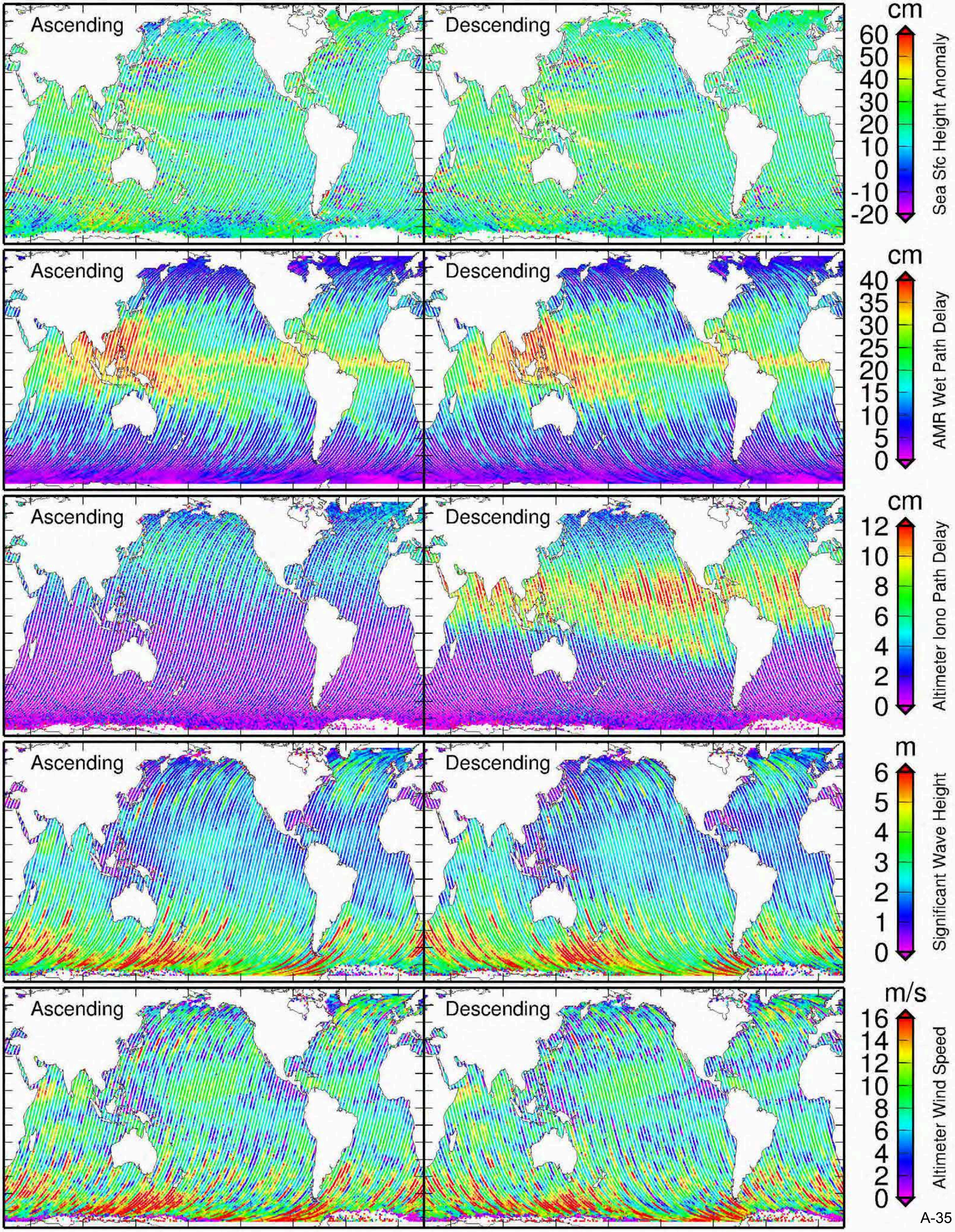
Jason-2 Cycle-142 2012-05-10 03:52:16 - 2012-05-20 01:50:47



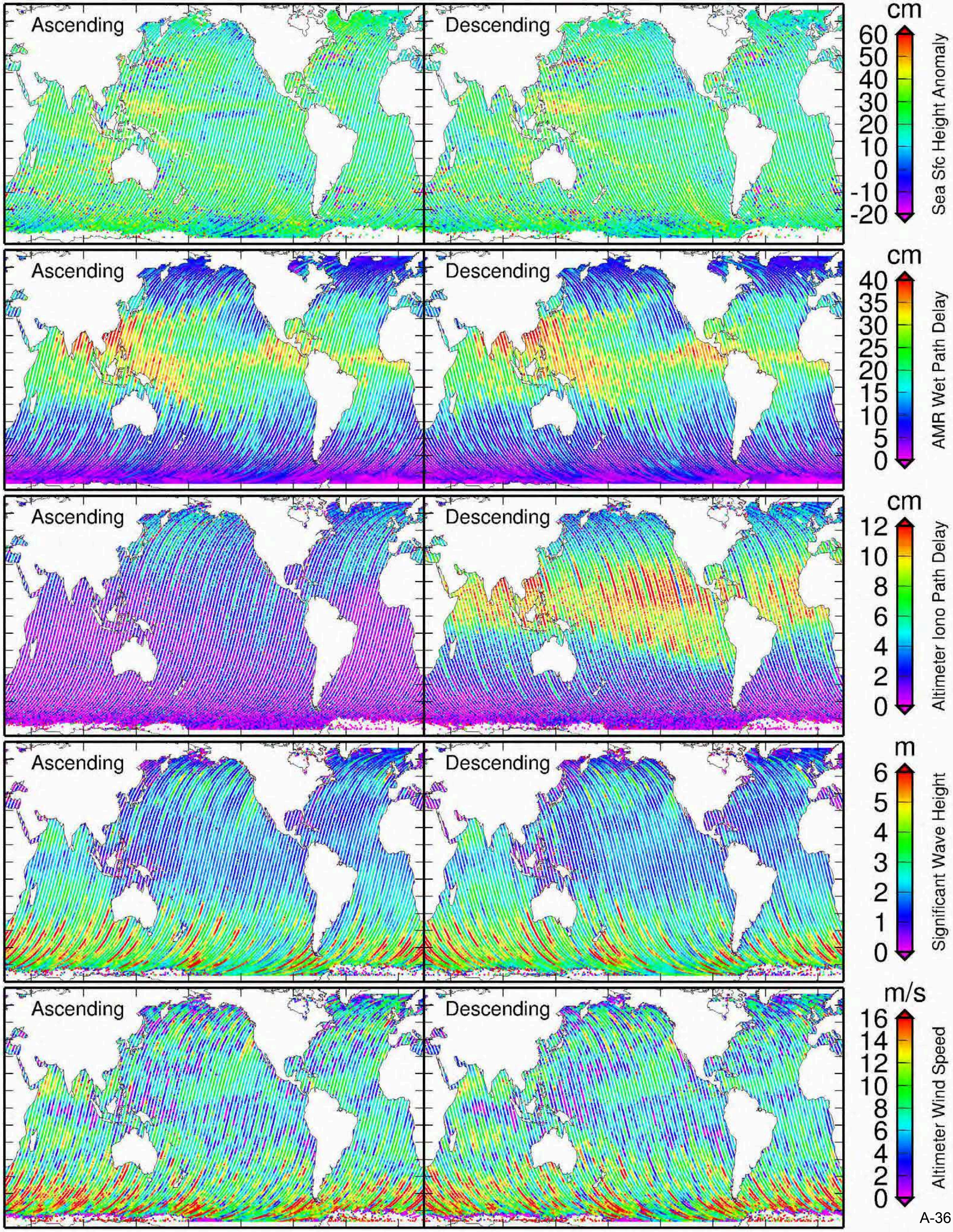
Jason-2 Cycle-143 2012-05-20 01:50:47 - 2012-05-29 23:49:19



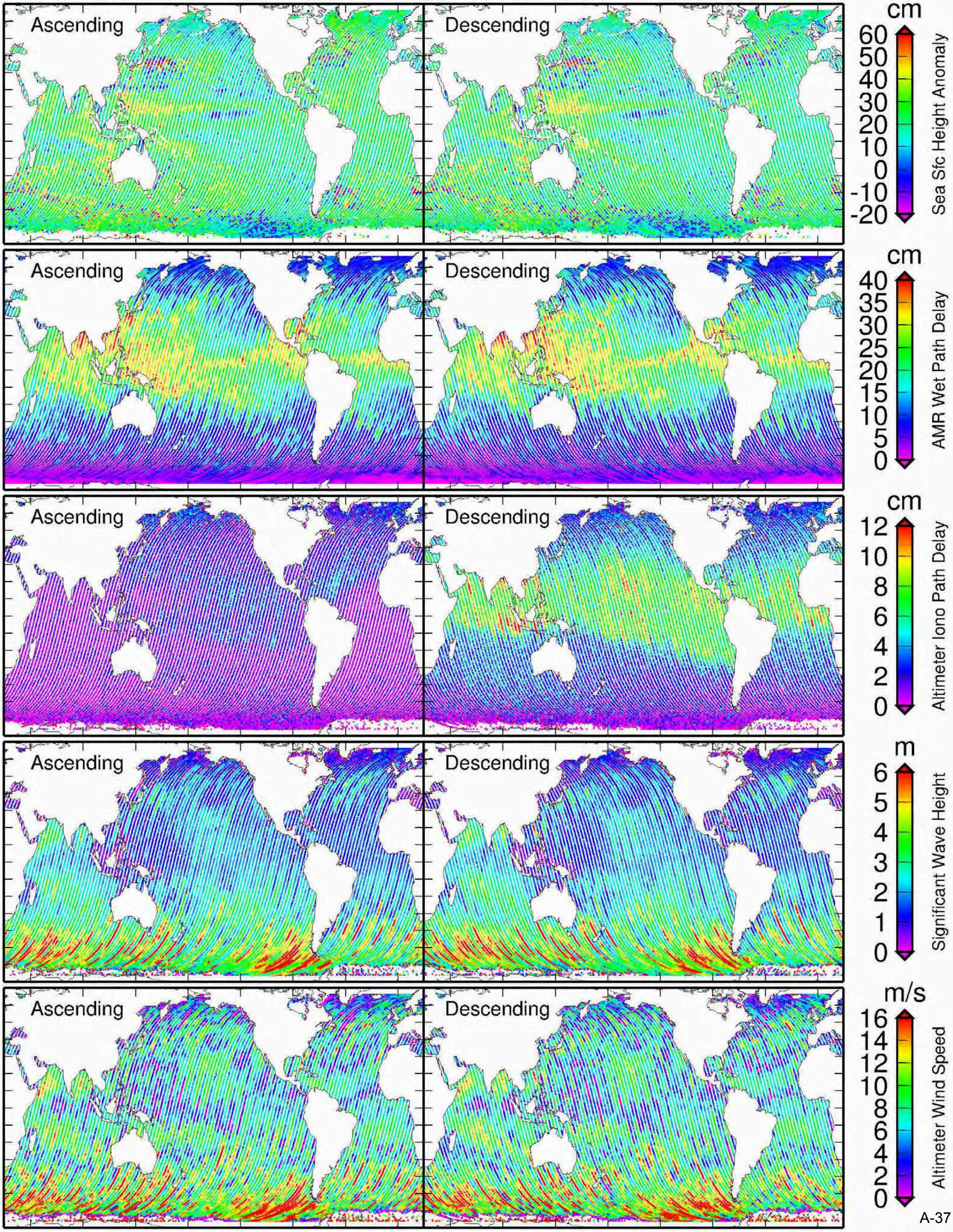
Jason-2 Cycle-144 2012-05-29 23:49:19 - 2012-06-08 21:47:50



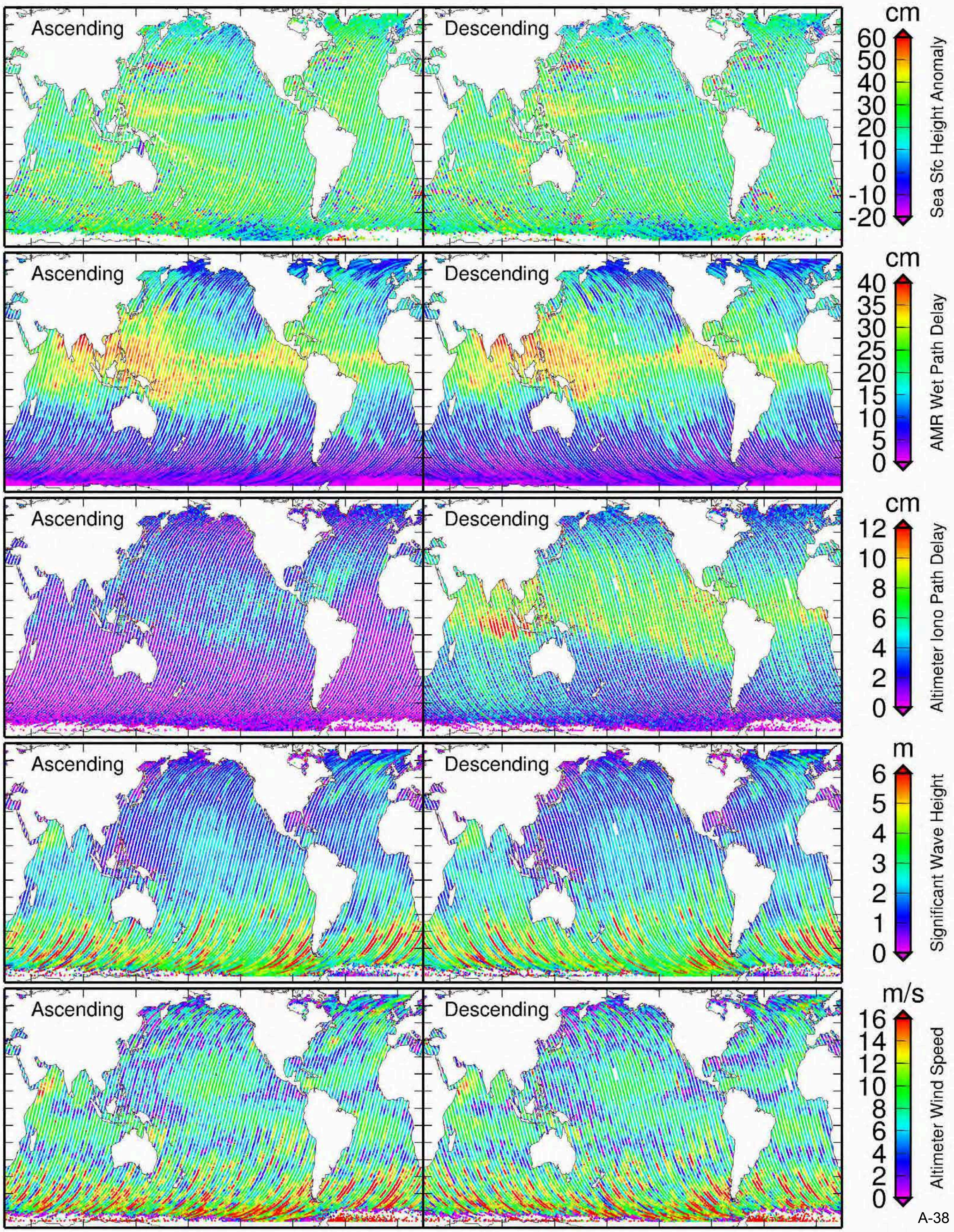
Jason-2 Cycle-145 2012-06-08 21:47:50 - 2012-06-18 19:46:22



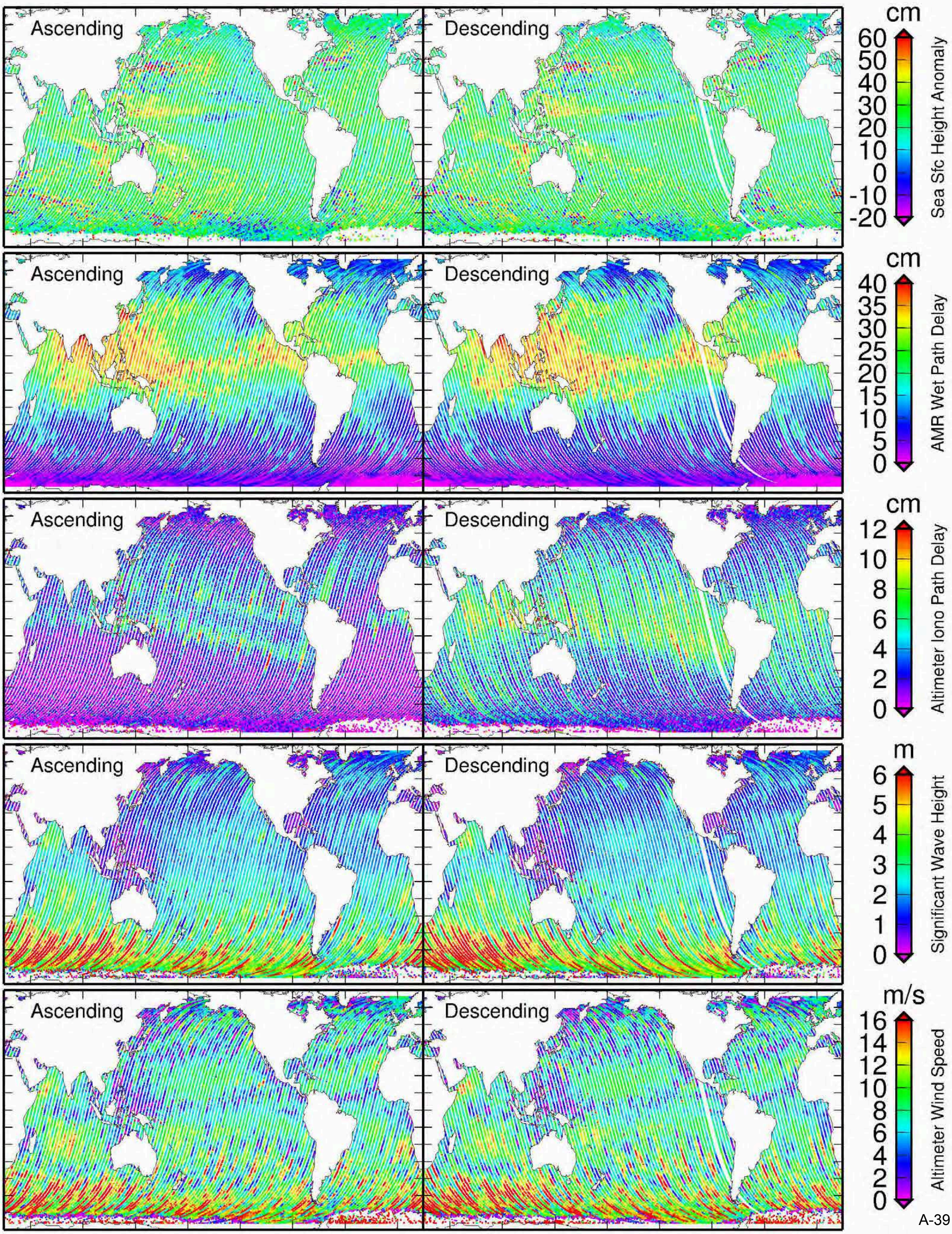
Jason-2 Cycle-146 2012-06-18 19:46:22 - 2012-06-28 17:44:54



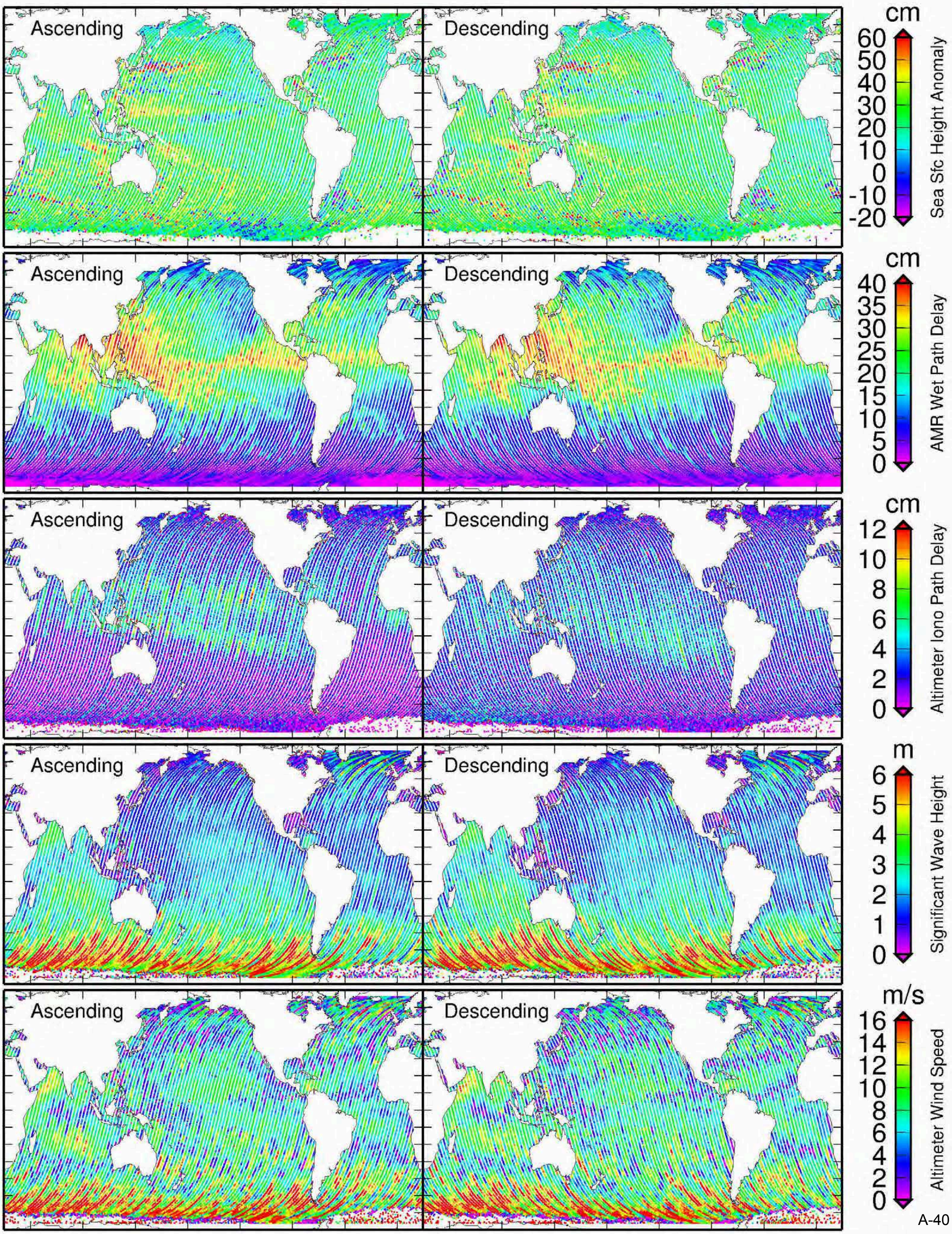
Jason-2 Cycle-147 2012-06-28 17:44:54 - 2012-07-08 15:43:25

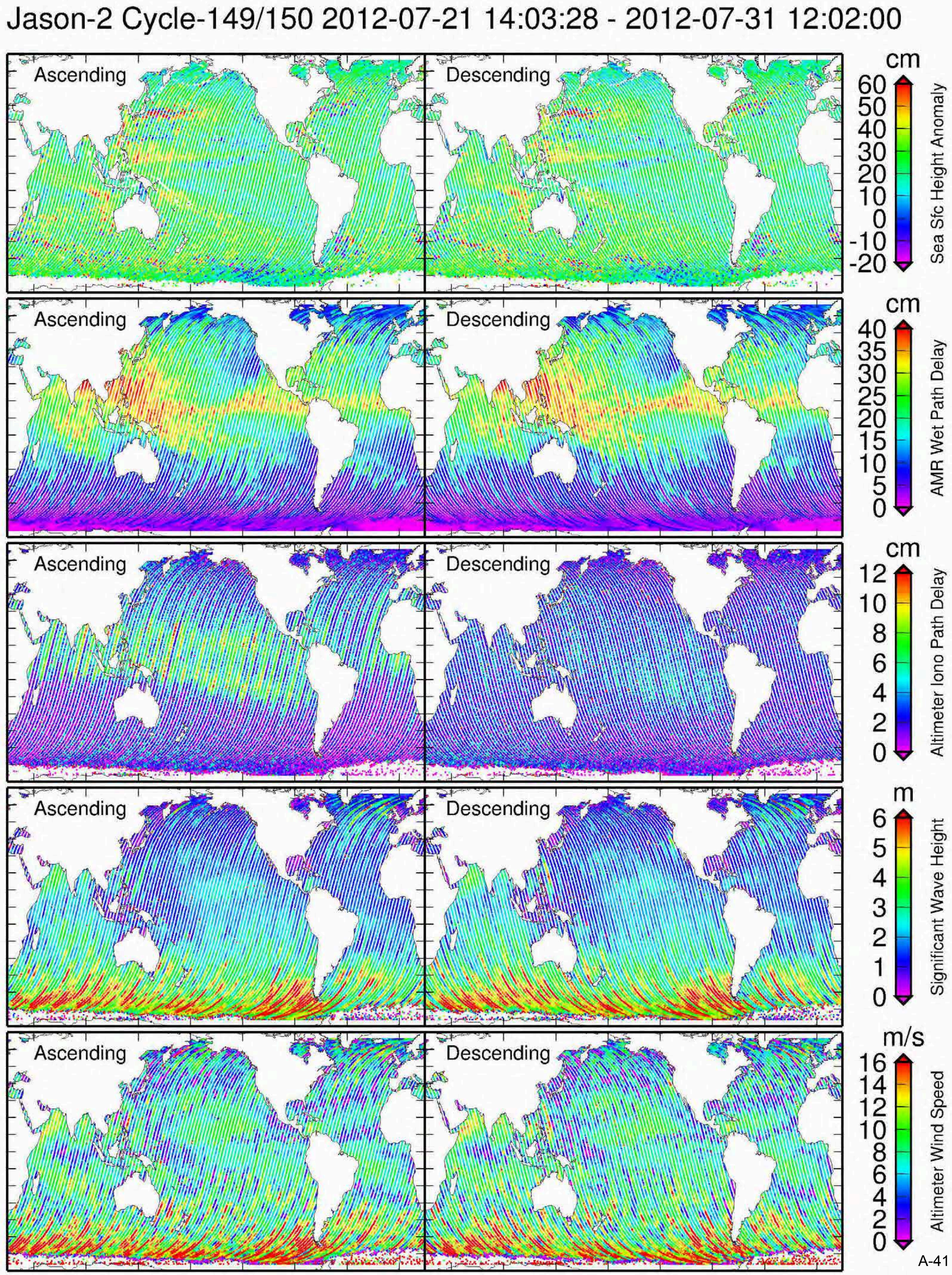


Jason-2 Cycle-148 2012-07-08 15:43:25 - 2012-07-18 13:41:57



Jason-2 Cycle-149 2012-07-18 13:41:57 - 2012-07-28 11:40:28





Jason-2 Cycle-149/150 2012-07-21 14:03:28 - 2012-07-31 12:02:00
Ascending
Descending
cm
60
50
40
30
20
10
0
-10
-20
Sea Sfc Height Anomaly
cm
40
35
30
25
20
15
10
5
0
AMR Wet Path Delay
cm
12
10
8
6
4
2
0
Altimeter Iono Path Delay
m
6
5
4
3
2
1
0
Significant Wave Height
m/s
16
14
12
10
8
6
4
2
0
Altimeter Wind Speed

Appendix B. Acronyms

Acronym	Definition
AMR	Advanced Microwave Radiometer
CLS	Collecte Localisation Satellites
CNES	Centre National d'Etudes Spatiales
CNG	Consigne Numerique de Gain (altimeter gain calibration)
DEM	Digital Elevation Model
DORIS	Doppler Orbitography and Radiopositioning Integrated by Satellite
ECMWF	European Centre for Medium-Range Weather Forecasts
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
GPSP	Global Positioning System Payload
J2TCCS	Jason-2 Tele-Command and Control System
JPL	Jet Propulsion Laboratory
NASA	National Aeronautics and Space Administration
NESDIS	National Environmental Satellite Data and Information Service
NOAA	National Oceanic and Atmospheric Administration
NRTAVS	Near Real-Time Altimeter Validation System
OGDR	Operational Geophysical Data Records
OSTM	Ocean Surface Topography Mission
SOCC	Satellite Operations Control Center
SSH(A)	Sea Surface Height (Anomaly)
SWH	Significant Wave Height
TM-NRT	Telemetry analyzer Near Real-Time