5.1 GPS Radiosonde

(1) Personnel (*: Leg-1, **: Leg-2, ***: Leg-1+2)

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Taro SHINODA	(Nagoya Univ.)	- not on board
Souichiro SUEYOSHI***	(GODI)	- Operation Leader (Leg-1 and 2)
Asuka DOI***	(GODI)	
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(2) Objectives

To obtain atmospheric profile of temperature, humidity, and wind speed/direction, and their temporal variations

(3) Methods

(3-1) Vaisala system

Atmospheric sounding by radiosonde by using system by Vaisala Oyj was carried out. The GPS radiosonde sensor (RS92-SGPD) was launched with the balloons (Totex TA-200/350). The on-board system to calibrate, to launch, to log the data and to process the data, consists of processor (Vaisala, SPS-311), processing and recording software (DigiCORA III, ver.3.64), GPS antenna (GA20), UHF antenna (RB21), ground check kit (GC25), and balloon launcher (ASAP). In the ”ground-check” process, the pressure sensor (Vaisala PTB-330) was also utilized as the standard. In case the relative wind to the ship (launcher) is not appropriate for the launch, the handy launch was selected.

The radiosondes were launched every 3 hours from 00UTC on Sep.28, 2011 to 00UTC on Oct.26, 2011 for leg-1, and from 03UTC, Oct. 29, 2011 to 00UTC, Dec.01, 2011 for leg-2. Both periods include the stationary observation period at (8S, 80.5E) and transfer period before and after the stationary observation. In addition, 6-hourly observation was also performed from 06UTC on Sep.26, 2011 to 00UTC on Sep.28, 2011. In total, 500 soundings were carried out, as listed in Table 5.1-1.

(3-2) Meisei system

The radiosonde system by using Meisei Inc. was also utilized. The system used in the observations consists of GPS sounding receiver system (Meisei RS-08AC), and an laptop PC with the processing

software “MGPS_R”. The sensor (RS-06G) was attached to the balloon (Totex TA-200) then launched. All launches were made by handy one, i.e. by not using the automatic launcher

The all launches are listed as Table 5.1-2. M001 and M002 were launched with tethering to Vaisala RS92. M003 and M004 were launched singly (using one RS-06G sensor to one TA-200 balloon) as test flights for water vapor sonde (see Section 5.8). M005 to M009 were launched singly but near-simultaneously to the Vaisala RS92 launch for intercomparison. M010 to M020 were launched in the middle of the launch time of Vaisala RS92 to enable high temporal resolution (every 1.5 hours from 0530UTC on Nov.28, 2011 (M010) to 1430UTC on Nov.29, 2011, by combining observations by Vaisala RS92 and Meisei RS06G).

(4) Preliminary Results

The results from Vaisala system are shown in the figures, while data from Meisei system will be examined. Figure 5.1-1 is the time-height cross sections during the stationary observation period at (5N, 139.5E) for equivalent potential temperature, relative humidity, zonal and meridional wind components. Several basic parameters are derived from sounding data as in Fig. 5.1-2, including convective available potential energy (CAPE), convective inhibition (CIN) and total precipitable water vapor (TPW). Each vertical profiles of temperature and dew point temperature on the thermodynamic chart with wind profiles are attached in Appendix-A.

(5) Data archive

Data were sent to the world meteorological community via Global Telecommunication System (GTS) through the Japan Meteorological Agency, immediately after each observation. Raw data is recorded as ASCII format every 2 seconds (Vaisala) or every 1 second (Meisei) during ascent. These raw datasets will be submitted to JAMSTEC Data Integration and Analyses Group. The corrected datasets will be available from Mirai website at http://www.jamstec.go.jp/cruisedata/mirai/e/, and CINDY website.

(6) Acknowldgement

Thanks are due to Dr. Kenji SUZUKI of Yamaguchi Univ. to provide the instruments for Meisei radiosonde observation system.

Table 5.1-1: Radiosonde launch log, with surface values and maximum height for Vaisala RS92-SGPD.

ID	Date	Launched Location		Surface States					Max. height	Cloud at Launch	
		Latitude	Longitude	P	T	RH	WD	WS		Am.	Type
		degN	degE	hPa	degC	%	deg	m/s	m		
Leg-1											
RS001	2011092606	1.817	88.506	1009.9	28.3	74	258	7.6	24168	9	Cu,Ci,As
RS002	2011092612	1.026	87.617	1007.8	28.3	75	244	4.1	23194	4	Cu,Ci
RS003	2011092618	0.348	86.565	1010.2	28.2	77	247	6.7	23216	9	unknown
RS004	2011092700	−0.322	85.632	1007.8	28.2	78	239	7.7	24352	8	Cb,Ac
RS005	2011092706	−1.016	84.672	1009.7	27.9	78	243	6.4	23012	3	Cu,Ci,Ac
RS006	2011092712	−1.678	83.765	1006.8	28.2	77	235	4.3	21938	4	Cu,Ci
RS007	2011092718	−2.266	82.924	1009.7	27.8	75	238	2.5	21773	2	unknown
RS008	2011092800	−2.950	81.988	1007.4	27.3	81	218	2.6	24353	2	Cu,Ci
RS009	2011092803	−3.300	81.491	1010.1	28.8	74	245	3.0	22905	4	Cu,Ci
RS010	2011092806	−3.665	80.994	1010.0	28.0	74	283	0.6	22836	7	Cu,Cb,Ci
RS011	2011092809	−3.986	80.502	1007.6	27.4	78	292	6.0	24964	8	Cu,Ci
RS012	2011092812	−4.149	80.195	1007.1	27.4	80	314	7.0	24555	3	Cu,Ci
RS013	2011092815	−4.396	79.688	1008.5	27.3	75	302	3.6	23529	1	Cu

RS014	2011092818	−4.651	79.167	1010.3	27.5	80	334	1.4	23900	2	Cu
RS015	2011092821	−4.899	78.638	1007.6	27.3	76	335	1.8	23758	2	Cu
RS016	2011092900	−5.033	78.096	1007.2	27.4	75	350	1.3	22386	1	Cu,Cb,Ci
RS017	2011092903	−5.128	78.374	1009.5	27.5	78	92	1.4	18643	5	Cu,Ac
RS018	2011092906	−5.094	78.085	1009.9	24.9	88	203	1.3	20309	9	Cu,Cb
RS019	2011092909	−5.111	78.110	1006.9	27.7	77	337	0.7	23254	8	Cu,Ci,Ac
RS020	2011092912	−5.452	78.387	1007.0	28.1	72	77	2.2	22633	5	Cu,Cb
RS021	2011092915	−5.946	78.797	1009.4	27.3	79	4	0.8	22441	3	Cu
RS022	2011092918	−6.564	79.309	1010.1	28.0	78	37	6.0	20676	1	Cu
RS023	2011092921	−6.912	79.608	1008.1	27.1	82	41	1.2	23090	1	Cu
RS024	2011093000	−7.375	79.976	1008.0	27.2	83	79	3.5	23111	4	Cu,Cb,Ci,Ac
RS025	2011093003	−7.819	80.353	1010.0	26.5	85	118	5.4	23973	9	Cu,Cb
RS026	2011093006	−7.985	80.526	1010.7	25.7	84	80	4.5	24097	10	Cu,Cb
RS027	2011093009	−7.988	80.529	1008.0	26.5	76	80	3.9	23358	9	Cb,Cu
RS028	2011093012	−7.999	80.517	1007.3	26.5	79	97	6.0	21262	8	Cu,Cb,Ac
RS029	2011093015	−8.010	80.509	1009.8	26.0	82	103	7.8	19628	9	Cu,Ns
RS030	2011093018	−8.007	80.510	1010.5	24.8	91	135	6.3	22676	10	Ns
RS031	2011093021	−8.006	80.518	1008.8	24.8	90	95	1.9	23190	10	Ns
RS032	2011100100	−8.007	80.509	1007.9	25.9	81	89	6.8	22875	5	Cu,Cb,Ai
RS033	2011100103	−8.006	80.517	1010.1	25.8	85	105	7.0	23706	9	Cu,Sc
RS034	2011100106	−8.004	80.517	1010.3	25.5	90	135	6.0	22781	10	Cb
RS035	2011100109	−7.988	80.510	1008.1	24.6	94	118	12.0	23204	10	Cb
RS036	2011100112	−8.011	80.512	1007.7	24.6	95	133	10.3	−	−	−
RS037	2011100112	−7.999	80.487	1007.9	24.4	92	140	9.9	17714	10	Cb,Cu,Ns
RS038	2011100115	−7.995	80.504	1009.2	25.7	88	122	10.5	21554	10	Cb,Cu,Ns
RS039	2011100118	−8.014	80.488	1009.6	26.7	84	133	12.0	22042	10	Cb
RS040	2011100121	−8.087	80.501	1007.4	25.7	88	119	13.4	22536	10	Cb
RS041	2011100200	−8.008	80.503	1007.0	27.3	79	135	9.6	21677	9	Cu,Cb
RS042	2011100203	−8.002	80.507	1009.3	27.5	76	130	10.3	23319	9	Cu,Cb
RS043	2011100206	−8.010	80.520	1009.1	27.9	73	136	9.8	22853	9	Cu,Ci,Cs
RS044	2011100209	−8.010	80.513	1006.7	28.1	73	130	7.6	22397	6	Ci,Cu
RS045	2011100212	−8.019	80.508	1006.6	28.2	73	123	9.0	23625	4	Cu,Ci
RS046	2011100215	−8.010	80.510	1008.6	27.9	75	111	10.4	23178	1	Cu
RS047	2011100218	−8.004	80.518	1009.7	27.8	74	105	11.6	23269	3	Cu
RS048	2011100221	−8.002	80.511	1007.5	27.7	71	114	10.3	20302	2	Cu
RS049	2011100300	−8.010	80.504	1007.5	27.7	70	104	7.2	22212	5	Cu
RS050	2011100303	−8.009	80.515	1009.9	27.9	69	112	8.5	22877	9	Ci,Cu,Ac
RS051	2011100306	−8.012	80.524	1009.5	28.2	66	107	3.3	22854	8	Ci,Cu
RS052	2011100309	−8.013	80.514	1007.1	28.0	72	117	7.4	20860	6	Ci,Cu
RS053	2011100312	−8.010	80.512	1007.2	28.0	68	118	6.7	21528	5	Cu,Ci
RS054	2011100315	−8.001	80.503	1009.5	28.1	71	97	5.8	23087	1	Cu
RS055	2011100318	−8.001	80.508	1009.8	27.6	77	114	7.7	22673	5	Cu
RS056	2011100321	−8.004	80.526	1007.8	27.0	81	99	8.1	23288	2	Cu
RS057	2011100400	−8.005	80.515	1007.7	25.6	89	102	9.9	22812	10	Cu,Cb
RS058	2011100403	−8.016	80.513	1009.9	25.1	87	134	4.3	23996	9	As,Cu
RS059	2011100406	−8.023	80.517	1009.9	25.3	87	145	3.1	20930	10	Ns,Cu
RS060	2011100409	−8.016	80.512	1007.4	25.6	88	111	1.0	24128	10	Cb,Cu
RS061	2011100412	−8.010	80.510	1007.6	25.2	93	162	5.4	16435	10	Cb,Cu
RS062	2011100415	−7.990	80.502	1009.2	25.0	92	46	8.7	16500	10	Cb,Cu,Ns

RS063	2011100418	−8.002	80.495	1010.0	24.9	92	60	7.2	4390	10	Cu,Ns
RS064	2011100421	−7.989	80.504	1008.6	24.2	86	29	5.3	4406	10	Cu,Ns
RS065	2011100500	−8.000	80.501	1008.6	25.2	88	163	5.6	26159	10	Cu,Cb
RS066	2011100503	−8.008	80.501	1010.5	27.9	74	106	10.9	23703	10	Cu,Cb,As
RS067	2011100506	−8.003	80.518	1009.9	28.0	75	95	9.9	24080	8	Cu,Ci,Ns
RS068	2011100509	−8.003	80.517	1007.8	27.9	75	97	9.7	22915	9	Cu,Ci
RS069	2011100512	−7.998	80.505	1007.5	28.1	76	101	13.1	22718	9	Cb,Cu,Ci
RS070	2011100515	−8.001	80.494	1009.2	27.9	72	110	13.1	23628	4	Cu,Ci
RS071	2011100518	−8.004	80.496	1010.4	27.9	73	100	8.1	21574	5	Cu,Ci,Cb
RS072	2011100521	−8.002	80.513	1008.5	27.7	76	109	10.0	22274	3	Cu,Cb
RS073	2011100600	−8.005	80.508	1008.5	27.7	74	108	11.3	22053	2	Cu,Ci
RS074	2011100603	−8.010	80.503	1010.9	27.9	74	103	10.0	23479	3	Cu,Ci
RS075	2011100606	−8.011	80.511	1011.3	28.0	75	116	8.1	24455	7	Ci,Cu
RS076	2011100609	−8.024	80.501	1009.2	28.2	70	110	7.4	22628	6	Ci,Cu
RS077	2011100612	−8.011	80.515	1009.4	28.2	70	127	7.4	23092	5	Cu,Ci,Cc
RS078	2011100615	−7.998	80.495	1011.4	27.9	75	102	6.8	23090	3	Cu,Ci
RS079	2011100618	−8.008	80.501	1011.9	27.3	77	123	6.0	23661	7	Cu
RS080	2011100621	−8.010	80.512	1009.6	26.9	83	132	8.1	23161	6	Cu,Ns
RS081	2011100700	−8.010	80.507	1009.8	26.8	78	132	9.8	22171	3	Ac,Ci
RS082	2011100703	−8.015	80.510	1011.7	27.5	76	139	10.1	23258	8	Cu,Ac,Cb
RS083	2011100706	−8.018	80.494	1011.2	27.9	72	133	9.3	19000	5	Cu,Ci
RS084	2011100709	−8.022	80.513	1009.1	27.9	73	146	7.6	23167	6	Cu,Ci
RS085	2011100712	−8.015	80.507	1009.5	28.0	75	142	6.1	23926	3	Cu
RS086	2011100715	−7.993	80.496	1011.2	27.8	73	139	5.8	22271	2	Cu
RS087	2011100718	−8.006	80.506	1011.3	27.4	74	111	3.9	22716	4	Cu,Cb
RS088	2011100721	−7.999	80.517	1009.1	25.3	88	102	7.5	21866	9	Cu,Cb,Ns
RS089	2011100800	−7.998	80.512	1009.6	24.9	86	119	5.9	23160	10	Cu,Cb
RS090	2011100803	−8.007	80.515	1011.4	24.9	85	97	2.5	24445	10	As,Cu
RS091	2011100806	−7.997	80.509	1010.9	25.6	87	88	5.8	23605	10	As,Ns,Cu,Ci
RS092	2011100809	−7.998	80.518	1008.4	26.6	79	119	7.2	23357	9	Cb,Cu,As
RS093	2011100812	−7.998	80.488	1009.0	24.6	85	125	9.9	23331	10	As,Cu
RS094	2011100815	−8.104	80.510	1010.2	27.5	76	148	4.1	22060	10	As,Cu
RS095	2011100818	−8.000	80.499	1010.6	27.8	74	125	7.0	23715	10	As,Ns,Cu
RS096	2011100821	−8.002	80.511	1008.4	27.3	77	127	10.5	23447	6	Cu,Sc
RS097	2011100900	−8.001	80.506	1008.4	26.4	74	127	11.7	23627	8	Cu,Ns
RS098	2011100903	−8.009	80.505	1010.7	25.6	88	111	8.7	23966	10	Cu,As,Ns
RS099	2011100906	−8.002	80.506	1010.2	27.6	78	105	8.4	24316	9	Cb,Ci
RS100	2011100909	−8.009	80.508	1008.3	25.9	86	81	5.3	24275	10	Cb.Cu,Ns
RS101	2011100912	−7.999	80.514	1008.1	26.9	81	86	5.7	21973	9.5	Cu, Sc, As
RS102	2011100915	−7.994	80.493	1009.9	26.7	83	115	5.3	20898	4	Cu, Sc, As
RS103	2011100918	−8.015	80.498	1010.5	26.4	90	138	7.4	23381	9	Cu,Cb,Ns,Sc
RS104	2011100921	−8.008	80.517	1008.5	25.7	88	116	8.5	21754	10	Cu,As
RS105	2011101000	−8.006	80.507	1008.2	26.0	86	127	9.7	23418	7	Cu,Ci
RS106	2011101003	−8.008	80.507	1011.3	24.7	94	149	13.9	23327	10	As,Cb,Cu
RS107	2011101006	−8.012	80.505	1011.2	25.9	83	137	9.2	23160	10	As,Cb,Cu
RS108	2011101009	−8.011	80.512	1009.2	26.5	80	98	10.7	23799	10	As,Cb,Cu
RS109	2011101012	−7.994	80.514	1008.0	25.8	86	126	9.1	17053	10	As,Cb,Cu
RS110	2011101015	−7.994	80.496	1009.8	26.6	84	117	12.6	23016	10	As,Cb,Cu
RS111	2011101018	−8.014	80.496	1010.7	27.1	77	118	13.2	22157	10	As,Cb

RS112	2011101021	−8.020	80.499	1008.3	26.0	83	131	12.6	23758	9.5	Cu,Cb,Sc,As
RS113	2011101100	−8.015	80.508	1008.4	27.1	69	136	12.7	23156	7	As,Cu,Ci
RS114	2011101103	−8.013	80.507	1010.7	27.2	72	128	12.4	24040	9	Cu,Ac
RS115	2011101106	−8.011	80.513	1011.2	27.6	62	130	9.9	25294	8	As,Ac
RS116	2011101109	−8.015	80.516	1008.0	27.4	67	119	10.5	23601	8	As,Ci
RS117	2011101112	−8.012	80.503	1008.6	27.5	71	105	12.4	22749	10	Cu,As
RS118	2011101115	−7.998	80.497	1010.0	27.6	66	120	7.3	20459	10−	Cu,As
RS119	2011101118	−7.995	80.497	1011.2	27.4	72	126	9.0	22889	9	As,Ac,Cu
RS120	2011101121	−8.003	80.513	1008.8	27.4	73	118	9.2	21424	9	As,Ac,Cu
RS121	2011101200	−8.007	80.507	1009.0	27.3	71	94	6.5	23080	6	As,Ac,Cu
RS122	2011101203	−8.008	80.507	1010.3	27.5	69	106	10.7	24092	2	Cu,Ci
RS123	2011101206	−8.003	80.504	1010.4	27.6	72	109	8.9	23281	6	Cu,Ci,Cb
RS124	2011101209	−8.004	80.505	1008.0	27.6	71	110	8.7	24733	6	Cu,Ci
RS125	2011101212	−8.007	80.512	1007.4	27.7	73	107	6.5	23459	7	Cu,Ci
RS126	2011101215	−7.989	80.500	1009.2	27.7	71	111	9.5	21243	6	Cu,Ci
RS127	2011101218	−8.023	80.492	1010.3	27.6	69	106	6.8	23034	5	Cu,Ci
RS128	2011101221	−8.011	80.514	1007.7	27.3	71	111	7.3	22666	5	Ci,Cu
RS129	2011101300	−8.006	80.512	1007.4	27.2	70	103	7.8	22524	3	Cu,Ci
RS130	2011101303	−8.006	80.513	1010.1	27.4	70	111	9.8	23372	9	Ac,Cu
RS131	2011101306	−8.007	80.507	1009.7	27.7	67	111	9.8	24796	4	Cu,Ci
RS132	2011101309	−8.000	80.504	1006.8	27.8	70	102	8.8	23239	3	Cu,Cb,Ac
RS133	2011101312	−8.001	80.499	1006.7	27.6	72	117	9.3	21854	6	Ci,Cu
RS134	2011101315	−7.997	80.483	1008.1	27.7	71	93	6.8	20658	6	Ci,Cu
RS135	2011101318	−8.014	80.506	1009.1	27.6	69	105	9.5	21528	5	Ci,Cu
RS136	2011101321	−8.006	80.514	1007.3	27.4	70	107	7.0	23707	2	Cu,Ci
RS137	2011101400	−8.005	80.510	1007.4	27.2	71	103	5.5	23451	2	Cu,Ci
RS138	2011101403	−8.001	80.506	1009.2	27.7	73	101	8.9	22847	1−	Cu
RS139	2011101406	−8.003	80.500	1009.1	27.8	70	100	8.0	24017	6	Cu,Ci,Ac
RS140	2011101409	−8.005	80.511	1006.8	27.9	69	106	8.0	23921	3	Cu,Sc
RS141	2011101412	−8.005	80.508	1006.4	27.8	75	99	6.3	22028	5	Ac,Cu,Sc
RS142	2011101415	−8.006	80.511	1008.2	27.7	77	86	8.7	21453	4	Cu,Ci
RS143	2011101418	−8.002	80.510	1008.4	27.6	79	121	10.4	22544	3	Sc,Ci
RS144	2011101421	−8.009	80.513	1006.3	27.6	77	110	9.6	22033	3	Ci,Sc
RS145	2011101500	−7.998	80.505	1006.4	27.5	79	108	8.4	21273	5	Cu,Ci,As
RS146	2011101503	−8.004	80.508	1008.4	27.9	78	122	10.4	24217	8	Cu,As
RS147	2011101506	−8.003	80.505	1008.6	28.1	75	109	9.4	23671	7	Cu,Cb,As
RS148	2011100609	−8.007	80.507	1006.3	28.1	77	87	9.0	22038	9	Cu,Ci,Cb,Sc
RS149	2011101512	−8.001	80.511	1006.6	28.0	77	84	8.9	22633	5	Cu,Ac.Ci
RS150	2011101515	−7.991	80.502	1008.8	28.2	79	88	6.2	22913	2	Ci
RS151	2011101518	−8.020	80.505	1009.2	27.9	76	100	8.0	22743	2	Cu
RS152	2011101521	−8.001	80.519	1007.1	27.7	77	84	5.6	20597	4	Ci,Cu
RS153	2011101600	−8.000	80.513	1006.6	27.5	77	101	6.2	22775	2	Cu,As
RS154	2011101603	−8.004	80.513	1008.7	28.0	78	105	9.7	23669	2	Cu,Ci
RS155	2011101606	−8.005	80.507	1007.9	28.0	74	114	9.0	21889	6	Cu,Ci,As
RS156	2011101609	−8.009	80.508	1005.5	28.2	71	99	11.8	23811	5	Cu,Ci,Cb
RS157	2011101612	−8.002	80.512	1005.6	28.1	75	99	9.9	22626	8	Cs,Ci,Cu
RS158	2011101615	−7.992	80.502	1007.7	27.9	75	97	6.7	21132	0	−
RS159	2011101618	−8.017	80.503	1008.7	28.0	74	88	8.2	22899	3	Ci,Cu
RS160	2011101621	−8.007	80.513	1007.4	27.8	76	108	7.7	20480		Cu,Ci

RS161	2011101700	−8.013	80.508	1007.5	27.5	74	119	9.6	23176	2	Cu,Ci
RS162	2011101703	−8.018	80.502	1009.4	27.9	73	123	9.1	23393	3	Cu,Ci
RS163	2011101706	−8.011	80.505	1009.3	28.1	71	112	10.0	21743	9	Cu,Ci,Cs
RS164	2011101709	−8.017	80.504	1006.8	28.2	73	112	8.2	22399	9.5	Cu,Cb,Ci,Ns
RS165	2011101712	−8.010	80.510	1006.3	28.0	76	107	9.7	20647	7	Cu,Ci
RS166	2011101715	−8.002	80.502	1008.8	27.9	75	104	7.4	22374	3	Cu,Ci
RS167	2011101718	−8.008	80.516	1009.4	27.8	72	100	11.1	21146	1	Cu,Ci
RS168	2011101721	−8.002	80.520	1007.4	27.5	73	107	6.3	21988	2	Ci,Cu
RS169	2011101800	−8.006	80.509	1006.8	27.3	76	123	8.3	23912	2	Ci,Cu
RS170	2011101803	−8.005	80.503	1008.6	27.7	78	125	10.5	23415	4	Cu,Ci,Sc
RS171	2011101806	−8.016	80.498	1008.2	28.0	75	109	10.8	22406	6	Cu,Ci
RS172	2011101809	−8.006	80.508	1006.3	28.1	71	105	9.3	23007	7	Cu,Cb,Ci
RS173	2011101812	−8.002	80.509	1006.1	28.1	74	120	10.3	23303	5	Cu,Ci
RS174	2011101815	−7.994	80.500	1007.4	27.8	75	105	6.3	22273	1	Cu,Ci
RS175	2011101818	−8.008	80.508	1008.7	27.9	70	108	8.9	22099	0	−
RS176	2011101821	−8.009	80.513	1006.8	27.5	73	99	5.8	22487	0	−
RS177	2011101900	−8.008	80.510	1006.8	27.3	74	96	6.2	24438	3	Cu,Ci,Ac
RS178	2011101903	−8.005	80.509	1008.3	27.6	70	97	9.0	23643	4	Cu,Ci
RS179	2011101906	−8.004	80.502	1008.0	27.9	71	109	7.9	22078	5	Cu,Ci
RS180	2011101909	−8.007	80.511	1005.6	27.8	71	105	6.8	22688	8	Cu,Ci,Sc
RS181	2011101912	−8.006	80.509	1005.7	27.7	71	98	6.7	22244	6	Cu,Ci,As
RS182	2011101915	−7.989	80.505	1007.5	27.7	67	89	6.7	20524	1	Cu,
RS183	2011101918	−8.015	80.511	1008.1	27.6	73	72	5.2	22550	0	−
RS184	2011101921	−7.995	80.524	1006.5	27.4	74	101	6.5	22780	1	Cu,Ci
RS185	2011102000	−8.004	80.509	1006.6	27.2	74	85	4.3	23400	2	Cu,Ci
RS186	2011102003	−8.006	80.511	1008.2	27.8	69	98	5.0	23885	3	Cu,Ci
RS187	2011102006	−8.001	80.542	1007.4	27.9	73	105	4.7	23896	3	Cu,Ci
RS188	2011102009	−7.994	80.530	1005.2	28.0	74	114	5.0	23734	4	Cu
RS189	2011102012	−7.993	80.527	1005.3	28.1	76	118	6.8	22983	1	Cu
RS190	2011102015	−7.993	80.527	1008.0	28.0	76	104	4.9	22901	1	Cu
RS191	2011102018	−7.988	80.517	1008.2	27.7	79	118	5.4	22504	0	−
RS192	2011102021	−7.989	80.519	1006.6	27.5	74	111	6.1	22863	0	−
RS193	2011102100	−7.995	80.524	1006.7	27.4	77	107	5.5	23181	0	−
RS194	2011102103	−7.986	80.521	1008.5	27.7	75	98	6.3	23808	1	Cu,Ci
RS195	2011102106	−7.992	80.515	1007.4	27.9	75	100	6.3	23519	2	Cu
RS196	2011102109	−8.001	80.510	1005.0	28.2	74	101	5.2	22854	1	Cu,Cb,Ci
RS197	2011102112	−7.999	80.510	1004.8	28.1	74	90	3.8	23704	2	Cu
RS198	2011102115	−7.988	80.506	1007.3	27.8	74	87	4.7	22262	1	Cu
RS199	2011102118	−8.012	80.491	1007.3	27.8	77	84	5.3	22147	0	−
RS200	2011102121	−8.007	80.518	1005.0	27.3	78	84	4.3	22686	0	−
RS201	2011102200	−8.001	80.499	1005.2	27.1	78	103	4.7	22920	1	Cu,Ci
RS202	2011102203	−8.001	80.505	1007.2	27.7	70	92	3.5	23947	1	Ci,Cu
RS203	2011102206	−8.001	80.503	1006.8	27.9	72	91	4.0	22971	4	Cu,Cb,Ci
RS204	2011102209	−8.000	80.508	1004.6	28.3	70	90	3.5	23516	5	Cu,Ci
RS205	2011102212	−8.006	80.516	1004.5	28.3	69	93	2.2	22543	2	Cu,Ci
RS206	2011102215	−7.987	80.500	1006.7	27.7	73	106	3.0	23500	1	Cu
RS207	2011102218	−8.000	80.501	1007.1	28.0	72	80	3.1	23460	0	−
RS208	2011102221	−8.003	80.518	1004.9	27.4	74	90	4.1	22999	0	−
RS209	2011102300	−8.001	80.511	1005.0	27.1	74	62	4.6	23225	1	Cu,Ci

RS210	2011102303	−7.998	80.510	1006.9	28.1	70	85	5.5	24034	2	Cu,Ci
RS211	2011102306	−7.996	80.516	1006.6	28.4	71	78	7.2	23335	4	Cu,Ci,Sc
RS212	2011102309	−7.998	80.516	1004.7	27.9	70	85	5.5	23190	3	Cu,Cb,Sc
RS213	2011102312	−7.996	80.513	1004.6	28.0	67	76	4.0	23060	2	Ci,Cu
RS214	2011102315	−8.000	80.510	1006.6	27.6	72	76	5.7	21034	1	Cu
RS215	2011102318	−8.003	80.517	1007.4	27.6	70	65	4.8	21871	1	Cu
RS216	2011102321	−7.991	80.514	1005.9	27.4	74	68	7.8	19919	2	Cu
RS217	2011102400	−7.996	80.510	1005.9	27.3	71	58	6.4	23955	1	Cu,Ci
RS218	2011102403	−7.998	80.506	1007.6	27.8	74	65	5.3	23821	4	Cu,Ci
RS219	2011102406	−8.000	80.507	1007.1	27.8	72	67	5.9	23738	4	Cu,Ci
RS220	2011102409	−7.710	80.491	1004.7	27.7	68	84	5.0	21595	2	Cu,Ci
RS221	2011102412	−6.966	80.598	1004.9	27.9	71	107	4.0	21714	6	Cu,Ci
RS222	2011102415	−6.213	80.500	1007.0	27.9	73	101	4.4	20920	1	Cu
RS223	2011102418	−5.505	80.497	1007.6	27.9	75	108	5.3	22722	4	Cu,Ci
RS224	2011102421	−4.759	80.487	1005.4	27.9	75	98	3.1	20994	7	Cu,Ci
RS225	2011102500	−4.031	80.525	1005.7	27.4	79	0	1.4	22843	7	Cu,Ci,Sc
RS226	2011102503	−3.286	80.501	1007.0	27.4	79	265	4.8	23955	7	Cu,Ci,Ac
RS227	2011102506	−2.543	80.506	1006.3	28.4	73	198	2.8	23961	7	Cu,Ci,Ac
RS228	2011102509	−1.849	80.506	1003.3	28.5	72	212	3.9	21272	9.5	Cu,Ci,Ac,Sc
RS229	2011102512	−1.146	80.386	1003.4	28.0	72	174	2.4	23176	9	Cu,As
RS230	2011102515	−0.469	80.151	1005.3	28.7	74	184	4.8	23256	4	Cu,Ac(As)
RS231	2011102518	−0.003	80.001	1006.0	28.4	73	151	5.9	22952	2	Cu
RS232	2011102521	0.487	79.979	1003.9	28.2	73	146	5.4	21111	4	unknown
RS233	2011102600	1.216	79.939	1004.2	26.3	83	22	3.9	21055	6	Cu,Ci
Leg-2											
RS234	2011102903	1.696	79.909	1006.7	25.8	89	268	7.1	23089	10	Cu,Sc
RS235	2011102906	0.949	80.016	1005.9	27.2	80	260	7.4	24530	10	Cu,Sc,As
RS236	2011102909	0.382	80.053	1003.8	25.4	89	288	5.3	22628	10−	Cu,Cb,Sc,As
RS237	2011102912	−0.330	80.126	1004.7	23.7	94	248	5.9	4691	10−	Cu,Cb,Sc
RS238	2011102915	−0.996	80.199	1006.7	25.7	85	257	2.8	22013	10−	Cu,Sc
RS239	2011102918	−1.756	80.266	1007.6	24.1	93	232	12.5	19660	10−	Cb
RS240	2011102921	−2.458	80.330	1005.2	26.7	85	262	5.8	19816	−	unknown
RS241	2011103000	−3.177	80.407	1004.9	26.7	81	255	4.1	23567	9	Cu,Sc
RS242	2011103003	−3.845	80.476	1007.3	26.6	84	278	7.7	23415	8	Cu,Sc
RS243	2011103006	−4.441	80.487	1006.9	27.5	78	301	3.8	24081	7	Cu,Sc,Ac
RS244	2011103009	−5.122	80.486	1005.0	27.4	73	259	6.0	23380	7	Cu,As,Sc,Ci,CC,Cs,Cb
RS245	2011103012	−5.763	80.483	1005.3	25.3	85	332	3.2	19664	8	Cu,Cb,Cs,As,Cc
RS246	2011103015	−6.411	80.498	1006.6	27.6	74	180	2.0	23708	5	Cu,Sc
RS247	2011103018	−7.050	80.508	1007.3	27.5	78	147	3.1	21796	4	Sc,As
RS248	2011103021	−7.685	80.513	1005.4	27.2	78	132	6.0	18003	5	St,Sc,As
RS249	2011103100	−8.005	80.494	1005.5	27.2	75	99	6.4	22605	5	Cu,Ac,Sc
RS250	2011103103	−8.000	80.501	1007.7	27.5	76	117	6.4	22243	8	Cu,Sc,Ci
RS251	2011103106	−8.009	80.508	1007.8	27.8	77	113	6.8	23046	7	Cu,Sc
RS252	2011103109	−8.011	80.511	1006.2	27.6	75	122	5.1	24163	10	Cu,As,Cc,Ci,Cs
RS253	2011103112	−8.005	80.513	1006.3	27.9	74	120	5.5	23998	10	Cu,As
RS254	2011103115	−8.009	80.514	1008.3	27.7	71	115	6.4	20754	9	Cu,As
RS255	2011103118	−8.010	80.523	1008.6	27.5	76	108	3.9	22468	10	Cu,As
RS256	2011103121	−8.006	80.513	1007.1	27.2	78	113	5.1	23504	−	unknown
RS257	2011110100	−8.012	80.510	1007.2	27.2	80	112	6.3	23417	5	Cu,Sc,Cs

RS258	2011110103	−8.005	80.508	1009.4	27.7	72	106	5.6	24503	3	Cu,As
RS259	2011110106	−8.007	80.509	1009.0	27.8	74	119	5.5	23839	6	Sc,Cu,As
RS260	2011110109	−8.017	80.507	1006.6	28.2	71	120	5.3	22990	9	Cu,Ci,Cs
RS261	2011110112	−8.019	80.507	1006.1	27.7	74	144	5.3	21857	9	Cu,St,Cs
RS262	2011110115	−8.008	80.502	1007.9	27.6	76	139	6.2	21365	7	Cu,As,Sc
RS263	2011110118	−8.033	80.507	1007.9	27.5	78	147	6.7	20528	6	Cu,Cs,St
RS264	2011110121	−8.012	80.516	1006.0	27.3	74	128	7.8	20909	8	Cu,Sc
RS265	2011110200	−8.012	80.502	1006.7	27.2	75	128	5.1	23026	6	Cu,Ac
RS266	2011110203	−8.008	80.508	1008.1	27.5	77	134	7.4	20479	7	Cu,ScAc
RS267	2011110206	−8.003	80.519	1008.0	27.6	78	137	6.8	15272	4	Cu,Sc
RS268	2011110209	−8.002	80.509	1005.8	27.6	79	144	6.4	23209	4	Cu,As
RS269	2011110212	−8.014	80.509	1005.6	28.2	73	114	6.7	23497	7	Cu,Ac
RS270	2011110215	−8.012	80.510	1007.2	27.1	81	151	9.4	22567	7	Cu,Sc,Cc
RS271	2011110218	−8.004	80.525	1007.3	27.5	78	101	7.5	23325	7	Sc,Cu,As
RS272	2011110221	−8.009	80.510	1005.6	27.2	70	103	9.3	23848	3	unknown
RS273	2011110300	−7.998	80.512	1005.7	27.2	77	107	7.6	24031	3	Cu,Sc,Ac
RS274	2011110303	−8.009	80.502	1007.9	27.5	69	112	9.4	24338	3	Ac,Cu
RS275	2011110306	−8.000	80.525	1007.6	27.7	72	110	6.0	23972	3	Cu,Sc
RS276	2011110309	−7.997	80.518	1005.4	27.8	72	94	6.8	23106	7	Cu,Cs
RS277	2011110312	−7.991	80.517	1005.8	27.7	78	76	4.1	22890	6	Cu,Cs
RS278	2011110315	−7.994	80.507	1007.6	27.5	72	75	6.0	22856	7	Cu,Cs
RS279	2011110318	−8.007	80.523	1008.3	27.5	75	77	6.7	23146	6	Cu,Sc
RS280	2011110321	−7.994	80.515	1007.0	27.4	76	65	5.2	23006	6	Cu,Cs
RS281	2011110400	−8.003	80.512	1007.4	25.2	79	97	6.8	22748	8	Cu,Sc,Ns
RS282	2011110403	−8.005	80.513	1009.4	27.4	77	108	5.9	23991	2	Cu
RS283	2011110406	−7.992	80.515	1008.8	27.6	71	105	5.1	24083	1	Cu
RS284	2011110409	−8.003	80.503	1006.2	28.2	72	89	5.0	23152	2	Cu
RS285	2011110412	−7.993	80.519	1006.5	27.7	75	111	7.1	21688	2	Cu
RS286	2011110415	−8.012	80.504	1008.8	27.7	78	114	6.3	23482	4	Cu
RS287	2011110418	−8.008	80.526	1009.6	27.6	76	100	8.5	22496	5	Cu
RS288	2011110421	−8.009	80.516	1007.9	27.4	77	81	8.2	21846	2	Cu
RS289	2011110500	−7.997	80.509	1008.2	27.3	78	92	8.0	22584	2	Cu,Sc
RS290	2011110503	−8.006	80.507	1010.7	27.7	76	100	6.4	22696	4	Cu
RS291	2011110506	−8.001	80.512	1009.6	27.7	78	114	6.0	21718	3	Cu,Ci
RS292	2011110509	−7.991	80.521	1007.2	27.4	79	101	6.4	21230	4	Cu,Cs
RS293	2011110512	−7.995	80.499	1006.9	27.4	77	104	8.7	21153	3	Cu,Cs
RS294	2011110515	−8.003	80.508	1009.1	27.4	79	102	6.3	22986	5	Cu
RS295	2011110518	−7.998	80.529	1009.8	27.2	80	96	8.1	21048	4	Cu
RS296	2011110521	−7.990	80.513	1007.8	27.0	81	103	8.4	23461	3	Cu
RS297	2011110600	−7.996	80.508	1008.0	27.1	79	109	6.7	23833	3	Cu
RS298	2011110603	−7.992	80.506	1010.2	27.6	75	95	9.3	23729	3	Cu,Sc
RS299	2011110606	−7.996	80.521	1009.8	27.6	75	105	7.7	22081	3	Cu
RS300	2011110609	−7.991	80.511	1007.2	28.1	78	98	6.4	23433	5	Cu,Cs,Ci
RS301	2011110612	−7.992	80.512	1007.0	27.7	72	96	7.1	22847	2	Cu
RS302	2011110615	−7.994	80.508	1009.1	27.7	76	84	7.4	22853	3	Cu
RS303	2011110618	−7.995	80.521	1009.7	27.5	76	78	7.0	22887	2	Cu
RS304	2011110621	−7.984	80.506	1007.2	27.2	80	70	8.2	22364	2	Cu
RS305	2011110700	−7.993	80.503	1008.0	27.3	79	74	8.0	23294	3	Cu,As
RS306	2011110703	−7.989	80.506	1010.0	27.3	83	86	9.5	23813	6	Cu,Ac

RS307	2011110706	−8.010	80.515	1010.3	27.4	81	101	8.0	25209	7	Cu,Sc,Ac
RS308	2011110709	−8.000	80.510	1008.7	25.9	77	116	8.6	24345	8	Cu,Ci,Sc
RS309	2011110712	−8.001	80.514	1007.9	26.6	82	104	8.0	21667	8	Cu, St, As, Ac, Ci
RS310	2011110715	−7.998	80.506	1009.6	26.7	83	83	8.5	22862	8	Cu,Sc,Ac,As
RS311	2011110718	−7.992	80.516	1010.2	27.4	79	93	10.4	22698	4	Cu
RS312	2011110721	−8.001	80.519	1008.2	26.9	81	83	8.8	21719	5	Cu
RS313	2011110800	−7.996	80.508	1008.4	27.2	83	86	7.6	24250	3	Cu
RS314	2011110803	−7.994	80.507	1009.9	27.3	77	89	9.6	23262	2	Cu,Ac
RS315	2011110806	−7.991	80.512	1010.1	27.7	77	101	9.3	23845	4	Cu,Ac
RS316	2011110809	−7.995	80.507	1007.9	27.7	74	91	7.7	23244	3	Cu,Ac,Sc
RS317	2011110812	−7.885	80.511	1008.0	27.8	77	103	9.1	7695	2	Cu,As
RS318	2011110815	−7.994	80.509	1010.5	27.6	75	92	9.1	21879	3	Cu,As
RS319	2011110818	−7.998	80.524	1010.6	27.6	77	95	10.3	23178	3	Cu,As,Ac
RS320	2011110821	−7.996	80.516	1007.8	27.2	74	101	10.5	21527	2	Cu,As
RS321	2011110900	−8.005	80.505	1007.9	27.0	77	109	9.9	23077	4	Cu
RS322	2011110903	−7.995	80.508	1010.1	27.5	71	95	9.5	23752	3	Cu,Ci
RS323	2011110906	−8.011	80.518	1009.9	27.5	69	96	6.7	23271	2	Cu,Ci,Ac
RS324	2011110909	−7.999	80.514	1008.0	27.6	66	115	7.1	20974	4	Cu,Ci,As,Sc
RS325	2011110912	−8.000	80.511	1007.6	27.3	70	129	8.7	20933	7	Ci,As,Cu
RS326	2011110915	−8.011	80.499	1010.1	27.2	72	141	5.3	23949	5	Cu,As,St
RS327	2011110918	−8.022	80.512	1011.3	27.2	74	143	6.1	21514	3	Cu
RS328	2011110921	−8.015	80.490	1008.2	26.9	71	132	8.2	22636	2	Cu,St
RS329	2011111000	−8.011	80.501	1007.5	26.8	71	128	9.8	23127	3	Cu,Ci
RS330	2011111003	−8.010	80.498	1009.2	27.2	73	122	8.2	20799	4	Cu,Ci
RS331	2011111006	−8.020	80.502	1008.5	27.3	73	130	9.6	23143	4	Cu,Ci
RS332	2011111009	−8.011	80.504	1006.1	27.4	69	135	9.2	23395	3	Cu,Ci,Sc
RS333	2011111012	−8.009	80.504	1006.1	27.4	72	136	7.8	21217	4	Cu
RS334	2011111015	−8.004	80.504	1008.7	26.7	74	132	3.3	20838	5	Cu,Sc
RS335	2011111018	−8.009	80.526	1009.8	27.1	72	118	6.9	23234	6	Cu,As,Ac
RS336	2011111021	−8.012	80.513	1007.5	26.8	73	88	5.9	22196	2	Cu
RS337	2011111100	−7.996	80.506	1007.3	26.6	77	91	6.3	22662	2	Cu
RS338	2011111103	−7.990	80.509	1009.2	27.4	76	89	8.3	22928	3	Cu,Ci
RS339	2011111106	−7.988	80.518	1009.1	27.4	73	83	6.0	23764	4	Cu,Ci
RS340	2011111109	−7.999	80.499	1007.1	25.7	83	103	4.7	23928	9	Cu,Ci,As
RS341	2011111112	−7.993	80.514	1006.7	27.7	69	102	6.8	20787	9	Cu, As, Cs
RS342	2011111115	−7.992	80.512	1009.2	27.3	76	99	6.0	23943	8	Cu,Cs,Sc
RS343	2011111118	−7.995	80.520	1009.9	27.0	79	69	5.3	22369	6	Cu,As,Ac
RS344	2011111121	−7.996	80.517	1007.7	27.0	76	80	5.6	22593	3	Cu,Sc
RS345	2011111200	−7.995	80.506	1007.7	26.7	77	87	4.9	23454	2	Cu,Ci,Sc
RS346	2011111203	−7.993	80.510	1009.5	27.3	75	137	3.8	23558	2	Cu,Ci,Sc,Ac
RS347	2011111206	−8.015	80.513	1009.2	27.2	77	152	1.6	23818	4	Cu,Ac,Ci
RS348	2011111209	−8.014	80.490	1007.2	27.1	77	210	2.9	24108	7	Cu,As,Ac
RS349	2011111212	−8.021	80.506	1007.2	26.1	83	140	9.3	22727	8	Cb,Cu,As
RS350	2011111215	−8.013	80.488	1009.1	26.4	83	179	4.9	19781	8	Cu,As,Ac
RS351	2011111218	−8.022	80.509	1009.4	26.2	82	114	1.3	22167	10	Cu, As, Sc
RS352	2011111221	−7.998	80.500	1006.5	26.1	84	16	0.3	22926	10	As,Ac,St
RS353	2011111300	−7.990	80.499	1006.8	26.4	84	3	3.1	22216	3	Cu,Sc
RS354	2011111303	−7.986	80.500	1009.5	26.9	82	30	1.3	23528	9	As,Cu
RS355	2011111306	−7.996	80.498	1008.9	27.3	81	68	5.0	23378	7	Cu,Ci

RS356	2011111309	−7.983	80.502	1006.4	27.3	81	52	4.6	22508	6	Cu,Ci,Ac,Sc
RS357	2011111312	−7.981	80.503	1006.1	27.3	77	63	5.6	22991	7	Cu,Cb,Si,Ci
RS358	2011111315	−7.998	80.500	1008.4	27.4	79	80	7.1	17216	4	Cu,St,As
RS359	2011111318	−7.988	80.518	1008.6	27.4	78	75	6.9	23333	6	Cu,Ci,Ac
RS360	2011111321	−7.987	80.511	1006.4	26.8	84	79	8.5	22645	7	Cu,Cb
RS361	2011111400	−7.989	80.505	1006.2	27.2	79	70	9.1	21012	1	Cu,St
RS362	2011111403	−7.986	80.498	1008.8	27.7	77	85	8.0	23622	4	Cu,Sc,As
RS363	2011111406	−7.982	80.523	1008.6	27.4	81	89	9.8	24444	4	Cu,As,Ci,Cc,Cg
RS364	2011111409	−8.006	80.508	1006.9	26.7	81	100	9.4	23931	7	Cu,Sc,Ac
RS365	2011111412	−7.998	80.501	1006.8	26.4	84	111	7.2	22429	9	Cu,Sc,Cb,As,Ac,Cc,Ci,C
RS366	2011111415	−7.997	80.505	1009.2	27.3	77	96	8.4	22812	0	−
RS367	2011111418	−8.011	80.511	1009.8	27.2	79	107	7.0	23133	3	Cu
RS368	2011111421	−8.024	80.490	1007.6	27.2	77	113	6.8	22725	6	Cu,Ac
RS369	2011111500	−8.008	80.508	1007.6	27.0	79	126	7.4	23288	5	Cu,As,Cb
RS370	2011111503	−8.018	80.510	1009.2	27.3	76	119	8.0	23329	3	Cu,As,St
RS371	2011111506	−8.018	80.515	1009.2	27.4	78	125	7.9	21533	3	Cu,As,Sc
RS372	2011111509	−8.017	80.499	1007.3	27.4	76	124	7.3	23279	6	cu,Cb,As,Sc
RS373	2011111512	−8.012	80.507	1006.4	27.4	77	119	8.6	22318	2	Cu, St
RS374	2011111515	−8.007	80.501	1008.4	27.4	82	109	9.7	22266	2	Cu
RS375	2011111518	−8.018	80.518	1008.5	27.3	81	93	10.5	23295	4	Cu
RS376	2011111521	−8.009	80.511	1006.2	27.2	79	91	9.2	21939	2	Cu
RS377	2011111600	−7.997	80.515	1006.4	27.1	81	112	8.1	23421	4	Cu,Sc,As
RS378	2011111603	−7.999	80.510	1007.9	27.7	73	94	9.9	23454	3	Cu,As,Cs,Ci
RS379	2011111606	−7.988	80.512	1008.4	27.5	78	82	7.9	22786	5	Cu,Ci,St,As
RS380	2011111609	−7.994	80.509	1006.4	27.5	78	89	9.1	23693	4	Cu,Ci,As,Ac
RS381	2011111612	−8.000	80.501	1006.3	27.6	75	121	6.0	17769	8	Cs,Ci,Cu
RS382	2011111615	−7.996	80.509	1008.4	27.4	78	123	6.4	19972	4	Ac,Sc
RS383	2011111618	−8.012	80.521	1009.0	27.3	81	100	5.1	22542	3	Cu,Ci
RS384	2011111621	−8.005	80.510	1006.8	27.0	79	121	4.6	22388	3	Cu
RS385	2011111700	−8.015	80.509	1007.0	26.9	83	140	4.8	23428	9	Cu,As,Cs,Ci
RS386	2011111703	−8.015	80.507	1008.9	27.2	81	125	7.2	24588	6	Cu,Ci,Cc,Cs,As
RS387	2011111706	−8.010	80.528	1008.4	27.4	79	116	6.3	24105	8	Cu,Ci,Cs,Sc,As
RS388	2011111709	−8.017	80.505	1006.3	27.4	80	129	6.3	23802	9	Cu,Sc,Ci,Cs
RS389	2011111712	−8.014	80.506	1005.8	27.4	80	121	7.9	22121	7	Cu,Cb,Cs,Sc
RS390	2011111715	−8.008	80.501	1008.1	27.3	78	100	9.4	23555	2	unknown
RS391	2011111718	−8.001	80.527	1008.4	27.5	79	101	10.0	23103	2	Sc
RS392	2011111721	−7.993	80.509	1006.3	27.2	81	103	9.5	22441	3	Cu
RS393	2011111800	−8.000	80.514	1006.1	27.2	78	96	8.6	23604	4	Cu,Ci,Cs,Sc
RS394	2011111803	−8.006	80.501	1008.0	27.6	79	101	8.5	23126	3	Cu,Cs,Ci,As
RS395	2011111806	−8.002	80.507	1007.5	27.2	79	110	9.5	23516	4	Cu,Cs,Ci,As
RS396	2011111809	−8.007	80.498	1004.9	27.7	77	109	11.6	23204	8	Cu,As,Sc,Cs
RS397	2011111812	−8.008	80.500	1005.0	26.0	83	95	9.7	23251	6	Cu,As
RS398	2011111815	−8.002	80.495	1007.3	27.6	80	103	10.0	21400	3	unknown
RS399	2011111818	−8.008	80.497	1007.8	26.5	80	98	11.6	23244	4	unknown
RS400	2011111821	−8.000	80.502	1005.9	26.9	86	104	8.7	21856	3	Cu
RS401	2011111900	−8.002	80.501	1006.1	26.6	83	90	9.7	23070	10	Cu,Cs,Ci,As,Sc
RS402	2011111903	−8.014	80.496	1008.1	27.7	77	97	12.3	24239	6	Cu,Ci,Cc,Cs,As
RS403	2011111906	−8.006	80.503	1008.0	27.6	80	86	6.6	23945	10	Cu,Cs,Ci,As
RS404	2011111909	−8.004	80.498	1005.4	27.4	82	68	7.9	21107	10	Cu,Sc,As,Cg,Cs

RS405	2011111912	−8.000	80.501	1005.2	27.0	81	71	9.0	18190	7	Cu,As
RS406	2011111915	−7.996	80.502	1007.8	27.1	79	81	7.1	20457	2	unknown
RS407	2011111918	−7.991	80.498	1008.6	27.0	81	105	5.3	21503	3	unknown
RS408	2011111921	−8.002	80.501	1006.5	26.8	78	109	10.0	22724	10	unknown
RS409	2011112000	−8.016	80.508	1006.5	27.2	77	108	8.9	22586	6	Cu,Ci,Cc,Cs,Sc
RS410	2011112003	−8.016	80.512	1008.3	27.5	73	105	8.8	23428	4	Cu,Ci,Cc,Cs
RS411	2011112006	−7.997	80.524	1008.7	27.6	77	97	7.5	24480	5	Cu,Cs,Ci
RS412	2011112009	−8.009	80.518	1006.9	28.2	72	112	6.5	23380	3	Cu,Ci
RS413	2011112012	−8.014	80.514	1006.7	27.5	74	120	6.6	22782	2	Cu,Ci
RS414	2011112015	−8.002	80.501	1008.8	27.5	72	110	9.1	22939	2	unknown
RS415	2011112018	−8.015	80.523	1009.2	27.2	74	110	7.4	21902	2	unknown
RS416	2011112021	−7.998	80.511	1006.6	26.8	74	112	6.8	22891	2	Cu
RS417	2011112100	−7.996	80.510	1007.0	26.7	75	112	8.3	21715	3	Cu,Ci
RS418	2011112103	−7.996	80.516	1008.3	26.9	72	98	6.4	23764	5	Cu,Cs,Ci
RS419	2011112106	−7.994	80.516	1007.4	27.1	73	88	5.5	22895	3	Cu,Cs,Ci
RS420	2011112109	−7.991	80.505	1005.1	27.2	72	109	6.7	23318	4	Cu,Cs,Ci
RS421	2011112112	−7.997	80.505	1004.7	27.4	74	108	5.9	22897	2	Cu,Ci
RS422	2011112115	−8.000	80.495	1007.4	27.3	75	103	4.9	21521	3	unknown
RS423	2011112118	−8.007	80.511	1007.9	27.1	78	98	4.3	21101	4	unknown
RS424	2011112121	−7.998	80.506	1005.8	26.8	79	83	3.9	21794	3	unknown
RS425	2011112200	−7.997	80.505	1005.9	26.6	77	95	5.0	21906	1	Cu,Ci,Cc,Cs
RS426	2011112203	−7.997	80.506	1007.5	27.0	75	95	3.4	23682	1−	Cu,Cs,Ci
RS427	2011112206	−8.002	80.524	1007.2	27.3	74	80	3.1	24104	1−	Cu,Ci
RS428	2011112209	−8.005	80.517	1004.6	27.3	76	90	3.3	24210	2	Cu,As,Ci
RS429	2011112212	−7.992	80.508	1004.4	27.4	75	131	3.1	22107	3	Cu,Ci
RS430	2011112215	−8.009	80.499	1006.8	27.5	76	110	3.7	22109	4	unknown
RS431	2011112218	−8.020	80.499	1007.2	27.2	76	101	5.0	22004	3	unknown
RS432	2011112221	−8.008	80.506	1004.9	26.8	77	125	3.6	23562	3	unknown
RS433	2011112300	−8.010	80.504	1004.8	26.5	78	127	4.8	21775	1	Cu,Ci
RS434	2011112303	−8.021	80.507	1006.7	27.2	75	125	5.4	22097	1	Cu,Ci,Cc
RS435	2011112306	−8.023	80.505	1006.4	27.3	77	120	5.5	23633	2	Cu,Ci
RS436	2011112309	−8.004	80.509	1004.1	27.4	78	103	5.4	23398	4	Cu,Ci,Cs
RS437	2011112312	−8.003	80.518	1003.4	27.3	80	139	6.1	23164	4	Cu,Ci
RS438	2011112315	−8.008	80.505	1005.4	27.3	79	121	6.0	23044	2	unknown
RS439	2011112318	−8.018	80.501	1005.8	27.0	80	137	6.0	21052	2	unknown
RS440	2011112321	−8.009	80.505	1003.6	26.6	83	143	6.5	22158	2	unknown
RS441	2011112400	−8.012	80.501	1003.5	26.7	83	135	7.7	22665	8	Cu,Ci,Sc,Ac,As
RS442	2011112403	−8.000	80.494	1005.6	27.3	82	140	9.4	24511	6	Cu,Ci,Cs
RS443	2011112406	−8.019	80.498	1005.6	27.0	81	155	8.5	23032	7	Cu,Ci,Cs,As
RS444	2011112409	−8.002	80.502	1003.4	27.5	76	146	6.9	23175	9	Cu,Sc,As,Cb
RS445	2011112412	−8.012	80.498	1003.3	27.5	77	165	8.6	21063	7	Cu,Cs,Ac,Sc
RS446	2011112415	−8.007	80.495	1005.9	27.5	73	149	8.6	20250	6	unknown
RS447	2011112418	−8.018	80.501	1006.1	25.6	86	129	9.4	20826	10	unknown
RS448	2011112421	−8.010	80.491	1003.6	24.6	92	181	8.2	21065	10	unknown
RS449	2011112500	−8.009	80.484	1003.5	25.8	88	186	6.3	23626	7	Cu,Ci,Cs,As
RS450	2011112503	−8.011	80.484	1005.6	26.8	80	161	6.8	23534	8	Cu,As,Ci,Cb,Ac,St
RS451	2011112506	−8.018	80.485	1005.3	26.6	83	159	4.9	19270	9	Cu,Ci,Sc,As
RS452	2011112509	−8.016	80.494	1003.0	26.3	86	127	7.1	24228	9	Sc,Cu,As,Ci,Cc
RS453	2011112512	−7.997	80.506	1003.2	26.5	84	94	8.6	22223	9	Cu,Cb,As

RS454	2011112515	−7.988	80.505	1005.5	26.4	79	58	4.2	20961	7	unknown
RS455	2011112518	−7.975	80.508	1006.8	26.7	79	45	1.7	20503	5	unknown
RS456	2011112521	−8.004	80.513	1004.4	26.8	82	120	1.4	17738	5	unknown
RS457	2011112600	−8.006	80.501	1004.3	25.0	87	9	5.0			
RS458	2011112600	−8.001	80.502	1004.8	25.4	84	59	8.9	22109	10−	Cu,Cb,As,Ci
RS459	2011112603	−7.992	80.512	1006.2	26.6	81	41	1.0	23706	9	Cu,Cb,Cs,Ci,As
RS460	2011112606	−8.000	80.525	1005.8	27.7	76	89	5.2	24006	8	Cu,Ci,Cs,Cc
RS461	2011112609	−8.008	80.501	1004.4	27.5	79	111	5.1	23934	8	Cu,Sc,As,Ci
RS462	2011112612	−8.003	80.509	1003.9	27.5	79	112	9.4	20425	6	Cu,As,Ci
RS463	2011112615	−7.998	80.509	1005.5	27.5	76	114	10.0	22384	3	unknown
RS464	2011112618	−7.990	80.518	1006.4	27.4	77	114	8.5	22322	4	unknown
RS465	2011112621	−7.998	80.508	1004.7	27.4	77	102	9.5	19552	4	unknown
RS466	2011112700	−8.003	80.503	1004.1	27.3	80	117	8.6	23162	4	Cu,Ci,Cs,Ac
RS467	2011112703	−8.013	80.505	1006.4	27.6	81	134	7.7	23983	6	Cu,Ci
RS468	2011112706	−8.023	80.509	1006.9	27.5	82	124	5.9	24677	10−	Cu,Cb,Ci,Cc,Ac,As
RS469	2011112709	−8.005	80.504	1004.7	27.9	82	117	6.9	24275	10	Cu,Sc,As,Cb,Cs
RS470	2011112712	−8.002	80.508	1004.7	24.7	90	165	2.9	21666	10	Cb, Cu, Sc, As
RS471	2011112715	−8.003	80.503	1005.9	27.4	84	125	8.6	22567	6	unknown
RS472	2011112718	−8.019	80.495	1006.2	27.2	84	117	8.9	20180	5	unknown
RS473	2011112721	−8.003	80.508	1004.1	26.8	86	124	8.5	21946	9	unknown
RS474	2011112800	−8.001	80.502	1003.5	27.4	83	123	8.1	20606	10	unknown
RS475	2011112803	−8.006	80.503	1005.8	26.8	86	127	5.3	23357	10−	Cb,Cu,Ci,Cs,Sc
RS476	2011112806	−8.002	80.514	1006.0	26.1	76	120	8.1	4865	10	Cu,Cb
RS477	2011112806	−8.000	80.497	1005.6	25.8	85	39	8.2	27245	10	Cu,Cb
RS478	2011112809	−7.882	80.341	1004.1	26.9	81	63	4.3	23853	10	Cu,Sc,As
RS479	2011112812	−7.361	79.950	1003.9	25.4	91	90	6.6	5003	10	Cu, Cb, As
RS480	2011112815	−6.777	79.461	1005.0	26.8	84	118	8.6	23954	8	unknown
RS481	2011112818	−6.194	78.986	1005.6	25.7	93	45	7.4	19004	10	unknown
RS482	2011112821	−5.703	78.585	1002.1	26.2	86	333	8.8	18855	10−	unknown
RS483	2011112900	−5.289	78.237	1003.1	26.6	80	290	9.1	23106	10	unknown
RS484	2011112903	−5.087	78.099	1005.6	25.8	83	305	7.7	24314	10−	Cb,Cu,As,Ci,Sc
RS485	2011112906	−5.118	78.099	1006.0	26.3	86	350	4.1	22896	10	Cb, Cu, Sc, As
RS486	2011112909	−5.098	78.104	1003.7	26.9	79	297	5.3	22288	9	Cu,Sc,As,Cs
RS487	2011112912	−5.089	78.099	1002.9	27.8	77	282	7.1	22460	9	Ci,Cu
RS488	2011112915	−5.078	78.095	1005.6	27.6	73	288	6.2	22227	6	Unknown
RS489	2011112918	−4.510	78.314	1006.7	27.6	80	327	4.9	22129	9	Unknown
RS490	2011112921	−3.847	78.557	1005.4	26.3	81	274	7.9	21560	9	Unknown
RS491	2011113000	−3.575	78.819	1005.3	27.8	77	291	7.1	22129	10	Unknown
RS492	2011113003	−2.477	79.074	1007.1	28.5	74	294	6.6	23128	9	Cu,As,Ci,Cs
RS493	2011113006	−1.782	79.334	1007.4	28.4	77	303	7.7	24074	5	Cu,Cs,Ci,Cc
RS494	2011113009	−1.069	79.606	1004.7	28.3	76	306	6.6	24744	10	Cu,CbCi,Cs
RS495	2011113012	−0.395	79.872	1005.1	28.0	79	320	4.5	21403	10	As
RS496	2011113015	0.004	80.017	1007.6	27.9	81	337	3.1	23369	10	As
RS497	2011113018	0.108	80.200	1007.7	27.9	80	280	4.6	−	−	−
RS498	2011113018	0.108	80.200	1007.7	27.8	81	272	3.5	21795	10	Unknown
RS499	2011113021	0.664	80.320	1006.4	27.8	78	304	3.4	21616	9	Unknown
RS500	2011120100	1.315	80.461	1005.7	27.5	77	16	0.7	21453	10	Unknown

Table 5.1-2: Radiosonde launch log, with surface values and maximum height, for Meisei RS-06G.

ID	Date and Time for Launch	Launched Location		Surface States					Max. height
		Latitude	Longitude	P	T	RH	WD	WS	
		degN	degE	hPa	degC	%	deg	m/s	m
M001	20110926 08:52	1.287	88.019	1007.2	28.3	73	238	3.7	N/A
M002	20110926 14:29	0.683	87.063	1010.0	28.4	75	237	4.8	23629
M003	20100930 06:57	−7.986	80.506	1009.3	26.2	77	102	4.8	23128
M004	20111031 09:48	−7.999	80.496	1011.0	27.9	76	115	4.4	23863
M005	20111119 05:37	−8.006	80.500	1013.1	28.2	75	88	7.9	21425
M006	20111120 17:32	−8.002	80.501	1009.2	27.7	74	106	7.5	23270
M007	20111125 05:55	−8.003	80.497	1005.0	27.0	82	155	4.9	(*1)
M008	20111126 20:27	−8.003	80.502	1005.8	27.7	77	107	9.0	24218
M009	20111127 17:29	−8.001	80.502	1006.2	27.4	84	121	10.1	21630
M010	20111128 07:02	−7.995	80.491	1005.3	26.7	85	5	5.2	23813
M011	20111128 10:00	−7.570	80.103	1003.6	26.5	82	75	4.8	22499
M012	20111128 12:57	−7.005	79.647	1004.4	25.6	87	94	7.1	17206
M013	20111128 15:59	−6.418	79.170	1005.5	26.5	88	93	4.3	16895
M014	20111128 19:00	−5.901	78.761	1003.6	27.1	83	345	9.4	17153
M015	20111128 21:58	−5.441	78.362	1002.0	26.5	78	304	9.0	22213
M016	20111129 01:01	−5.110	78.096	1004.0	27.1	81	293	8.0	24553
M017	20111129 04:01	−5.105	78.090	1006.4	25.1	90	300	10.2	23406
M018	20111129 07:03	−5.128	78.102	1004.9	26.8	79	303	10.4	22816
M019	20111129 10:00	−5.074	78.082	1002.6	28.0	74	297	9.4	23133
M020	20111129 12:59	−5.101	78.127	1004.1	28.0	77	296	6.9	23013

(*1) Due to bad telemetry, the data is very sparse, especially above 3000m height.

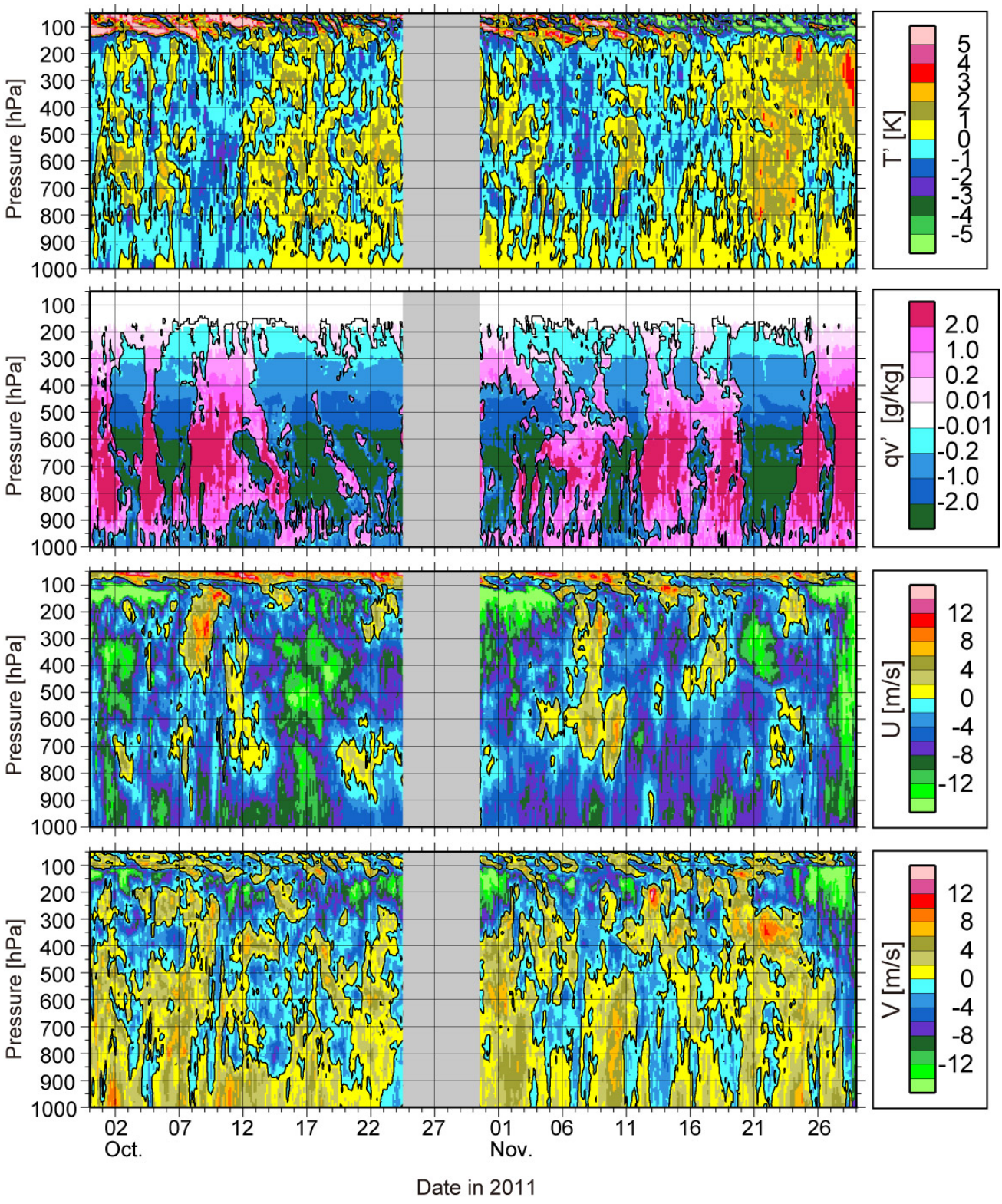

Fig. 5.1-1: Time-height cross sections of observed parameters at (8S, 80.5E); (a) temperature, in anomaly to the period-averaged value at each pressure level, (b) water vapor mixing ratio, in anomaly to the period-averaged value at each pressure level, (c) zonal wind (absolute value), and (d) meridional wind (absolute value). The gray shade indicates the period when Mirai was not at (8S, 80.5E) for port call at Colombo.

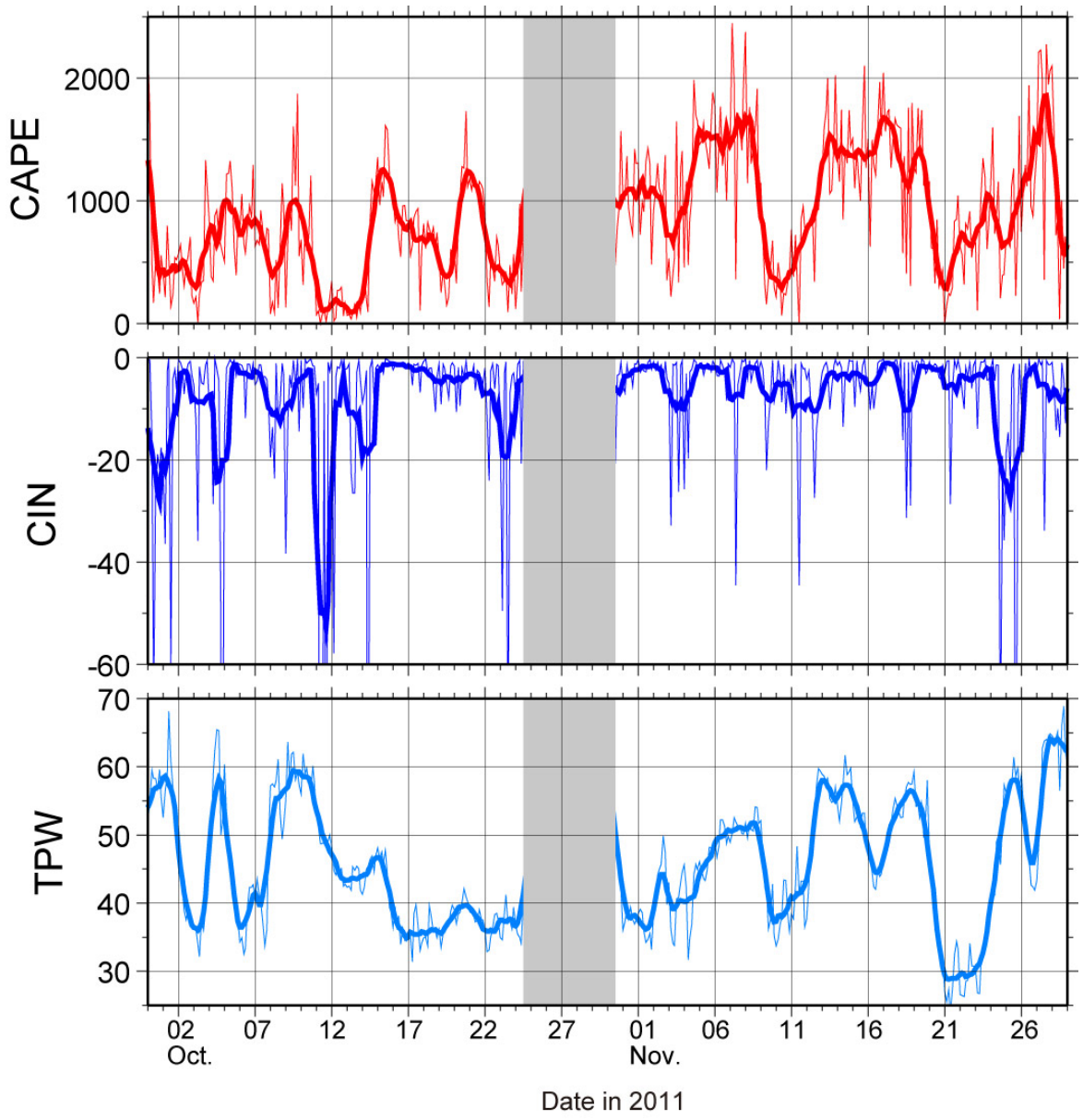

Fig. 5.1-2: Time series of the parameters derived from the radiosonde observations; (a) CAPE, (b) CIN, and (c) precipitable water. The thin lines are from the 3-hourly snapshots, while the thick lines are the running mean for 25 hours. The gray shade indicates the period when Mirai was not at (8S, 80.5E) for port call at Colombo.