Supplement of

New temperature and pressure retrieval algorithm for high-resolution infrared solar occultation spectroscopy: analysis and validation against ACE-FTS and COSMIC

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This supplementary information contains a list of ACE-FTS occultations used in our analysis and compared to ACE-FTS v3.5 and COSMIC data products. The list is organized into sets as in the article. ACE-FTS IDs indicate whether the occultation was at sunset, measured from the top of the atmosphere downward and marked *ss*, or at sunrise, marked *sr*, and are sequentially numbered since the start of operation. COSMIC IDs are in the form *Cjjj.YYYY.DDD.HH.MM.Gii* where *jjj* and *ii* are the indices of the COSMIC and GPS satellites, and *YYYY.DDD.HH.MM* are the year, ordinal date, hour and minute of the occultation. Latitude, longitude, and β angle are of the ACE-FTS vertical profiles at the 30 km tangent altitude. Mean z spacings are calculated from the retrieved ACE-FTS tangent altitudes between 20 and 100 km.

Table 1. Middle East

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing
ss5195	30 July 2004	34.99°	85.36°	−34.1°	4.5 km
ss5211	31 July 2004	31.37°	52.37°	−36.7°	4.4 km
ss5225	01 August 2004	27.96°	68.53°	−39.0°	4.0 km
sr5616	28 August 2004	29.62°	50.29°	−44.3°	3.7 km
sr10063	25 June 2005	−37.59°	161.36°	62.0°	1.5 km
ss10081	27 June 2005	31.88°	51.38°	58.7°	2.1 km
ss10604	01 August 2005	32.03°	85.72°	−36.4°	4.2 km
ss10605	01 August 2005	31.80°	61.16°	−36.6°	4.6 km
ss10619	02 August 2005	28.39°	77.37°	−38.8°	4.0 km
ss10620	02 August 2005	28.14°	52.82°	−39.0°	4.2 km
sr11009	29 August 2005	29.07°	84.88°	−44.9°	3.7 km
sr11010	29 August 2005	29.38°	60.38°	−44.7°	3.7 km
sr11024	30 August 2005	33.42°	77.42°	−42.6°	3.9 km
sr11025	30 August 2005	33.70°	52.93°	−42.5°	3.9 km
sr15160	06 June 2006	31.28°	63.32°	59.2°	2.0 km
ss15999	02 August 2006	32.02°	81.99°	−36.5°	4.6 km
ss16000	02 August 2006	31.78°	57.43°	−36.7°	4.3 km
ss16015	03 August 2006	28.11°	49.12°	−39.1°	4.1 km
ss21394	03 August 2007	32.10°	85.20°	−36.6°	4.3 km
ss26790	03 August 2008	32.05°	68.94°	−36.9°	4.2 km
ss26804	04 August 2008	28.64°	85.23°	−39.2°	4.1 km
ss26805	04 August 2008	28.39°	60.68°	−39.3°	4.1 km
sr27195	31 August 2008	29.21°	70.17°	−45.3°	3.7 km
sr27209	31 August 2008	33.33°	87.33°	−43.2°	3.8 km

Table 2. Arctic 2010

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing
ss35483	16 March 2010	77.91°	169.09°	10.0°	5.8 km
ss35533	19 March 2010	74.48°	34.38°	1.0°	5.8 km
ss35542	20 March 2010	73.76°	175.41°	−0.6°	5.9 km
sr36477	22 May 2010	67.81°	139.78°	10.1°	5.8 km
sr36539	26 May 2010	68.76°	39.31°	21.7°	5.3 km
sr36540	26 May 2010	68.74°	14.44°	21.9°	5.3 km
sr36550	27 May 2010	68.48°	125.74°	23.7°	10.8 km
sr36554	27 May 2010	68.34°	26.26°	24.5°	5.3 km
sr36563	28 May 2010	67.96°	162.45°	26.2°	5.1 km
sr36598	30 May 2010	65.44°	12.85°	32.8°	4.7 km
sr36603	31 May 2010	64.95°	−111.25°	33.7°	4.9 km
sr36605	31 May 2010	64.74°	−160.89°	34.1°	4.7 km
ss37209	11 July 2010	66.37°	−100.83°	29.8°	4.8 km
ss37218	11 July 2010	66.97°	35.58°	28.3°	6.8 km
ss37238	13 July 2010	67.92°	−101.52°	24.4°	5.1 km
ss37268	15 July 2010	68.44°	−127.32°	18.8°	5.5 km
ss37280	16 July 2010	68.36°	−65.52°	16.5°	5.5 km
ss37300	17 July 2010	67.90°	157.80°	12.8°	5.6 km
ss37304	17 July 2010	67.76°	58.52°	12.1°	5.8 km
ss37332	19 July 2010	66.42°	84.33°	6.9°	5.8 km
ss37336	19 July 2010	66.17°	−14.73°	6.1°	5.8 km
ss38791	26 October 2010	69.95°	−2.61°	57.7°	2.2 km
ss39009	10 November 2010	67.17°	63.81°	23.3°	5.2 km
ss39045	12 November 2010	66.42°	−95.56°	16.7°	5.6 km
ss39129	18 November 2010	64.59°	13.39°	1.0°	5.8 km
ss39144	19 November 2010	64.24°	7.27°	−1.8°	5.8 km
ss39159	20 November 2010	63.89°	1.19°	−4.6°	5.8 km
ss39160	20 November 2010	63.86°	−23.21°	−4.8°	5.9 km
ss39191	22 November 2010	63.08°	−59.59°	−10.7°	5.7 km
ss39204	23 November 2010	62.74°	−16.71°	−13.2°	5.6 km

Table 3. Arctic Fall

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing	COSMIC ID
sr32864	19 September 2009	74.57°	−132.61°	1.3°	5.8 km	C003.2009.262.14.38.G08
ss33549	05 November 2009	68.78°	−166.00°	35.0°	4.5 km	C002.2009.309.01.14.G13
ss33562	05 November 2009	68.51°	−123.72°	32.7°	4.7 km	C006.2009.309.23.25.G07
ss33580	07 November 2009	68.15°	156.39°	29.5°	4.9 km	C002.2009.311.05.12.G03
ss33603	08 November 2009	67.66°	−45.58°	25.4°	5.5 km	C002.2009.312.16.43.G15
ss33617	09 November 2009	67.36°	−27.61°	22.9°	5.3 km	C002.2009.313.16.18.G15
ss33643	11 November 2009	66.80°	57.28°	18.1°	5.5 km	C005.2009.315.11.33.G15
ss33665	12 November 2009	66.31°	−120.04°	14.1°	5.7 km	C002.2009.316.21.41.G16
ss33810	22 November 2009	62.79°	−59.25°	−13.2°	5.7 km	C005.2009.326.18.40.G14
ss33827	23 November 2009	62.30°	−113.88°	−16.5°	5.6 km	C002.2009.327.21.49.G25
ss33841	24 November 2009	61.87°	−95.27°	−19.2°	5.4 km	C003.2009.328.22.03.G23
sr38467	04 October 2010	84.27°	−100.62°	37.7°	4.4 km	C001.2010.277.15.59.G27
sr38524	08 October 2010	83.70°	−33.09°	46.9°	3.5 km	C001.2010.281.12.19.G25
sr38634	15 October 2010	80.61°	157.33°	60.6°	1.6 km	C001.2010.289.00.32.G02
ss39000	09 November 2010	67.35°	−76.30°	24.9°	5.2 km	C002.2010.313.20.26.G17
ss39225	25 November 2010	62.15°	−168.89°	−17.2°	5.6 km	C001.2010.329.02.33.G20

Table 4. Arctic Winter

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing	COSMIC ID
sr29131	09 January 2009	60.13°	−0.32°	−26.9°	5.1 km	C003.2009.009.10.05.G10
sr29551	06 February 2009	67.05°	−180.87°	48.7°	3.3 km	C001.2009.037.21.28.G11
ss29702	17 February 2009	61.45°	−149.60°	61.8°	1.4 km	C005.2009.048.01.46.G13
sr34446	04 January 2010	56.35°	160.98°	−42.1°	3.9 km	C001.2010.004.22.13.G11
sr34474	06 January 2010	58.04°	−160.15°	−36.7°	8.8 km	C003.2010.006.20.23.G15
sr34538	11 January 2010	60.65°	81.09°	−24.5°	5.2 km	C003.2010.011.04.37.G24
sr34581	14 January 2010	61.88°	112.73°	−16.2°	5.6 km	C001.2010.014.00.59.G04
sr34668	19 January 2010	63.81°	149.83°	0.3°	5.8 km	C003.2010.019.23.49.G06
sr34706	22 January 2010	64.52°	−58.01°	7.4°	9.7 km	C001.2010.022.12.36.G04
sr34708	22 January 2010	64.55°	−106.86°	7.8°	5.7 km	C001.2010.022.15.57.G24
ss35082	17 February 2010	55.70°	−124.01°	61.9°	1.4 km	C002.2010.048.01.43.G17
ss35139	20 February 2010	73.71°	−99.45°	61.0°	1.6 km	C002.2010.051.21.57.G12
ss35196	24 February 2010	79.06°	−69.61°	56.1°	2.4 km	C005.2010.055.18.25.G22
sr39838	05 January 2011	56.28°	−106.75°	−42.5°	3.9 km	C001.2011.005.16.07.G09
sr39912	10 January 2011	60.02°	−107.91°	−28.3°	4.9 km	C001.2011.010.15.35.G09
sr39976	15 January 2011	61.98°	132.04°	−16.1°	5.5 km	C001.2011.014.23.54.G08
sr40020	18 January 2011	63.03°	138.69°	−7.7°	5.7 km	C004.2011.017.23.35.G08
sr40139	26 January 2011	65.37°	113.41°	14.6°	5.4 km	C004.2011.026.02.34.G32
sr40193	29 January 2011	66.30°	−125.91°	24.5°	5.2 km	C001.2011.029.17.15.G31
ss40535	21 February 2011	75.14°	−107.45°	61.1°	1.7 km	C006.2011.052.23.09.G22
ss40550	22 February 2011	77.01°	−120.28°	60.1°	1.7 km	C002.2011.053.22.05.G28
sr45403	18 January 2012	62.85°	104.51°	−9.8°	5.6 km	C006.2012.018.03.22.G30
sr45449	21 January 2012	63.88°	62.23°	−1.0°	5.7 km	C006.2012.021.05.23.G13

Table 5. Antarctic Spring

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing	COSMIC ID
sr30341	01 April 2009	-83.50°	-40.38°	-35.0°	4.5 km	C001.2009.091.11.22.G22
sr30350	02 April 2009	-83.53°	103.16°	-36.5°	4.5 km	C004.2009.092.02.09.G12
sr30475	10 April 2009	-81.47°	-47.62°	-55.1°	2.6 km	C004.2009.100.13.45.G12
sr30480	10 April 2009	-81.32°	-170.19°	-55.7°	2.9 km	C004.2009.100.22.10.G28
ss30628	20 April 2009	-65.39°	-103.32°	-61.7°	1.7 km	C005.2009.110.23.40.G07
ss30664	23 April 2009	-68.41°	89.73°	-59.0°	2.0 km	C005.2009.113.10.34.G25
ss30721	27 April 2009	-69.37°	130.73°	-52.4°	2.9 km	C002.2009.117.07.22.G03
ss30739	28 April 2009	-69.31°	49.76°	-49.9°	3.2 km	C002.2009.118.11.43.G06
ss30754	29 April 2009	-69.19°	42.48°	-47.7°	3.4 km	C004.2009.119.12.06.G18
ss30775	30 April 2009	-68.96°	-111.49°	-44.5°	3.7 km	C006.2009.120.21.27.G28
ss30814	03 May 2009	-68.41°	14.51°	-38.1°	4.3 km	C005.2009.123.14.17.G23
ss30819	03 May 2009	-68.33°	-107.76°	-37.3°	4.4 km	C005.2009.123.22.42.G14
ss30871	07 May 2009	-67.43°	61.02°	-28.4°	5.0 km	C006.2009.127.11.37.G18
ss30945	12 May 2009	-66.03°	52.92°	-15.2°	5.6 km	C006.2009.132.11.04.G18
ss31095	22 May 2009	-62.72°	-9.07°	12.5°	5.7 km	C005.2009.142.16.12.G16
ss31120	24 May 2009	-62.04°	101.09°	17.2°	5.6 km	C002.2009.144.08.46.G27
sr35416	11 March 2010	-60.44°	179.20°	21.9°	5.4 km	C003.2010.070.17.18.G04
sr35691	30 March 2010	-82.42°	-22.81°	-27.2°	5.1 km	C004.2010.089.09.46.G28
sr35774	05 April 2010	-82.93°	137.05°	-41.1°	4.1 km	C002.2010.095.01.30.G15
sr35787	05 April 2010	-82.78°	-177.30°	-43.2°	3.9 km	C001.2010.095.22.50.G27
sr35775	05 April 2010	-82.92°	112.89°	-41.3°	4.5 km	C001.2010.095.02.38.G31
sr35830	08 April 2010	-81.99°	-140.91°	-49.7°	5.2 km	C002.2010.098.20.21.G23
sr35840	09 April 2010	-81.76°	-24.57°	-51.1°	3.1 km	C002.2010.099.13.10.G15
ss36233	06 May 2010	-67.71°	162.96°	-34.0°	4.6 km	C006.2010.126.03.19.G20
ss36308	11 May 2010	-66.44°	129.86°	-20.8°	5.4 km	C005.2010.131.05.25.G03
ss36442	20 May 2010	-63.76°	97.47°	3.7°	5.9 km	C002.2010.140.08.21.G09
ss36472	22 May 2010	-63.06°	85.35°	9.3°	5.8 km	C005.2010.142.08.56.G15
ss36613	31 May 2010	-58.23°	-111.78°	35.7°	4.8 km	C005.2010.151.21.44.G22
ss41959	29 May 2011	-60.25°	24.35°	26.6°	5.9 km	C001.2011.149.14.13.G16

Table 6. Low-Latitudes

ACE ID	Date	Latitude	Longitude	β angle	$\bar{z}$ spacing	COSMIC ID
sr30660	23 April 2009	-27.84°	43.90°	-59.4°	1.9 km	C004.2009.113.04.19.G18
sr30733	28 April 2009	7.35°	50.15°	-50.7°	3.0 km	C006.2009.118.01.37.G16
ss34863	02 February 2010	-34.24°	-164.73°	35.8°	4.4 km	C004.2010.033.06.04.G02
ss35008	12 February 2010	16.26°	-100.09°	56.8°	2.3 km	C004.2010.043.01.12.G18
ss38637	16 October 2010	22.36°	-164.09°	60.8°	1.7 km	C006.2010.289.05.09.G31
sr38918	04 November 2010	-30.94°	-24.04°	39.2°	4.2 km	C002.2010.308.06.54.G09
ss42994	07 August 2011	27.12°	15.62°	-40.5°	4.1 km	C006.2011.219.18.33.G31