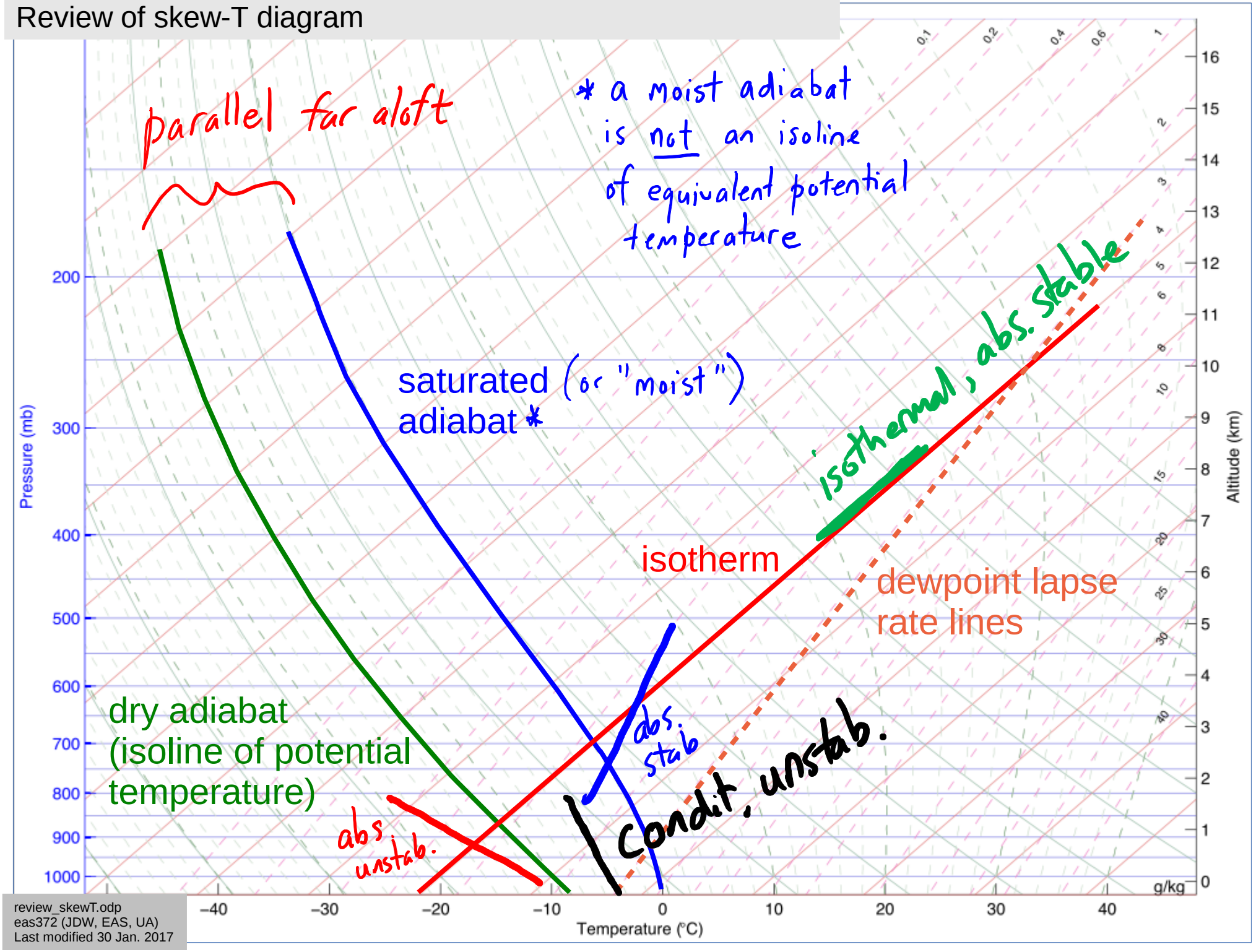
Review of skew-T diagram



review_skewT.odp
eas372 (JDW, EAS, UA)
Last modified 30 Jan. 2017

Review of skew-T diagram

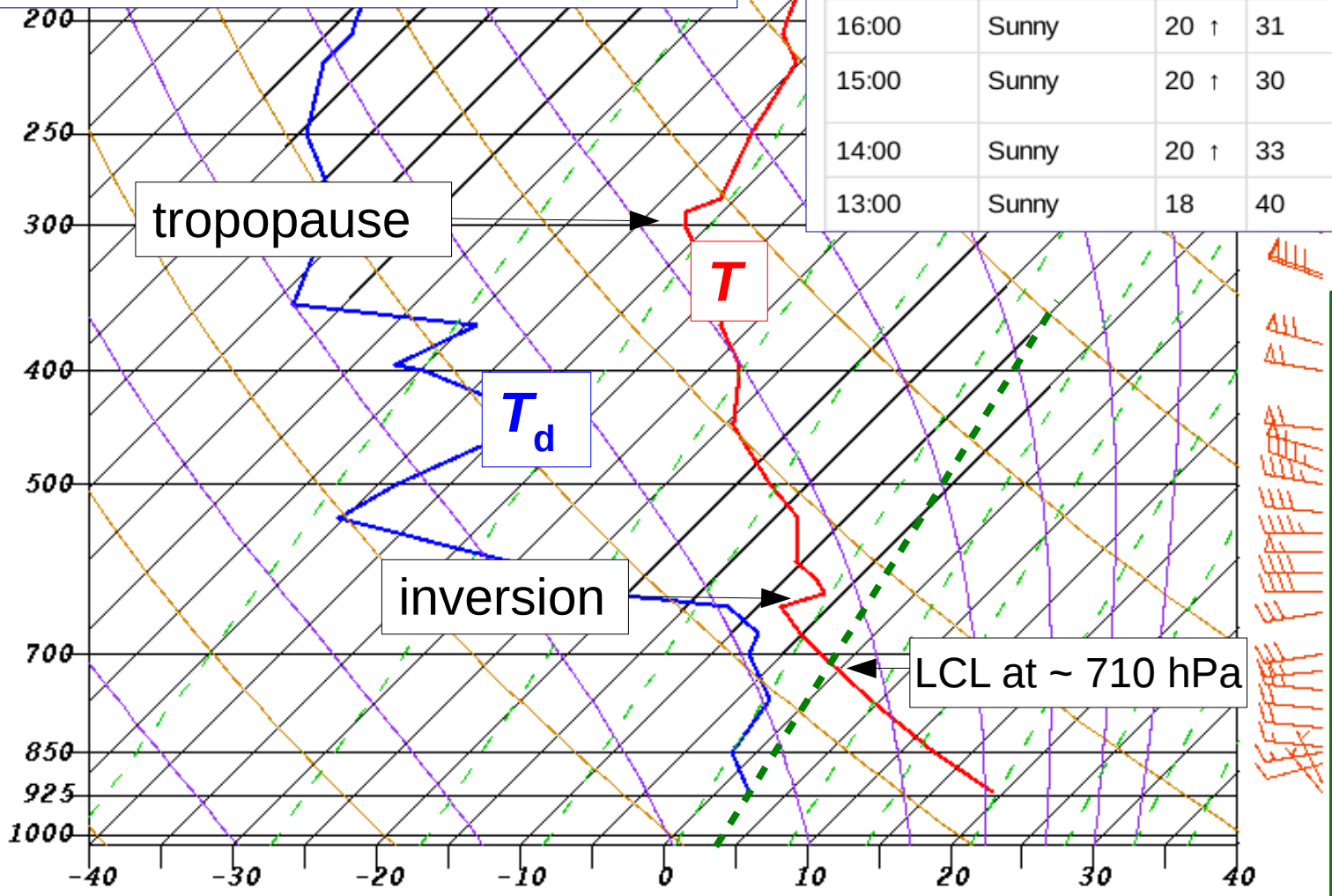
Strong mixing has produced a deep ground-based layer whose lapse rate ELR ~ DALR

Height of the LCL can be estimated as:

$$z_{LCL}\,[\mathrm{m}] \approx = 125\,(19-2) = 2.13\,\mathrm{Km}$$

Stony Plain radiosonde 00Z Sun 19 Oct. 2014

Date / Time (MDT)	Conditions	Temp (°C)	Humidity (%)	Dew Point (°C)	Wind (km/h)
18 October 2014	Edmonton City Centre Airport				
18:00	Sunny	16	38	2	N 6
17:00	Sunny	19	32	2	NW 11
16:00	Sunny	20 ↑	31	2	WNW 17
15:00	Sunny	20 ↑	30	2	NW 13 gust 33
14:00	Sunny	20 ↑	33	3	WNW 28
13:00	Sunny	18	40	4	W 15



The green dashed lines ("isohumes") give the dewpoint lapse rate for unsaturated adiabatic ascent...

nominally 0.2°C per 100 m versus DALR of 1°C per 100 m.

In an unsaturated layer, T and T_d converge at 0.8°C per 100 m

Equivalent temperature T_{eq} : condense all water vapour, converting latent heat to sensible heat so that $T_{eq} \geq T$. Equivalent potential temperature : adjust pressure to reference value

71119 WSE Edmonton Stony Plain Observations at 00Z 19 Oct 2014

Height of the 710 hPa level ~ (2998+2743)/2 2.87 km ASL or **2.17 km AGL**

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot	THTA K	THTE K	THTV K
1000.0	22									
925.0	696									
918.0	766	19.2	2.2	32	4.91	320	3	299.6	314.5	300.5
902.0	914	17.6	1.3	33	4.69	335	5	299.5	313.8	300.3
869.8	1219	14.4	-0.5	36	4.27	255	12	299.3	312.4	300.1
850.0	1413	12.4	-1.6	38	4.02	260	13	299.1	311.4	299.9
838.7	1524	11.3	-1.8	40	4.03	275	13	299.2	311.5	299.9
808.3	1829	8.5	-2.2	47	4.05	275	18	299.3	311	
779.0	2134	5.6	-2.6	56	4.08	275	21	299.4	311	
765.0	2284	4.2	-2.8	60	4.09	275	23	299.4	311	
750.5	2438	2.8	-3.8	62	3.87	275	25	299.5	311	
722.5	2743	0.0	-5.7	65	3.48	265	26	299.8	310	
700.0	2998	-2.3	-7.3	69	3.17	260	29	299.9	309	
671.0	3333	-5.3	-8.1	81	3.11	260	31	300.2	309	
643.7	3658	-7.8	-11.3	76	2.52	260	32	301.0	308	
636.0	3752	-8.5	-12.2	75	2.37	263	34	301.2	308	
627.0	3863	-7.3	-17.3	45	1.58	267	36	303.8	309	
620.0	3951	-6.3	-22.3	27	1.04	270	38	305.9	309	
619.1	3962	-6.4	-22.6	27	1.02	270	38	305.9	309	
605.0	4143	-7.7	-26.7	20	0.72	270	39	306.4	308	
595.4	4267	-8.9	-28.4	19	0.62	270	39	306.4	308	
583.0	4430	-10.5	-30.5	18	0.52	270	46	306.4	308	
572.3	4572	-11.1	-33.7	14	0.39	270	53	307.3	308.7	307.4
550.0	4877	-12.5	-40.5	8	0.20	270	47	309.2	310.0	309.2
534.0	5103	-13.5	-45.5	5	0.12	274	41	310.6	311.1	310.6
528.4	5182	-14.2	-45.2	5	0.13	275	39	310.8	311.2	310.8
500.0	5600	-17.7	-43.7	8	0.16	280	43	311.4	312.0	311.4

Stony Plain 696 m ASL

θ

virtual potential temp

equivalent potential temperature

Normand's rule:

Find the LCL graphically as the intersection of the isohume that runs through surface dewpoint with the dry adiabat that runs through surface temperature