Progress and plans for the development of a unified dropsonde quality assurance and visualization capability

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Background:

Two software packages have been used on operational aircraft missions to date:

1)HRD's Editsonde package on all P3 missions and G-IV flights prior to 2005
2)NCAR's ASPEN software on AFRC C-130 missions

HRD, NCAR, and NHC determined that substantial differences in the products (TEMP DROP messages, ASCII files) between the two packages could occur due to differences in the algorithms and capabilities of the two software suites

Both software packages are for single computer platforms- ASPEN: Windows, Editsonde: HP Unix

The JHT decided to fund an effort to reconcile the differences in the software, improve on the capabilities, and convert the code and graphics packages to work on multiple computer operating systems

Progress:

A formal meeting was held in 2009 among the primary users of dropsonde quality assurance software users to identify the major requirements of the project which include:

1)Retain the basic structure and graphical capabilities of ASPEN while adding additional capabilities that are available in Editsonde

2)The highest priority of these capabilities are the use of synoptic maps to more easily analyze and correct observations from individual flights and more control of the data editing features

3)The new software package should have multi-platform capability

1)Reconciliation of quality control algorithms between the Aspen and Editsonde software

Progress (cont'd)

1)Significant progress has been made in the reconciliation of the algorithms, especially for the critical near-surface region of the sounding. Differences between Aspen and Editsonde were carefully studied and the causes of discrepancies were documented. Aspen was modified so that the near-surface processing produces results very close to the output from Editsonde

2)A prototype software package has been built that is multi-platform capable. The package uses the Nokia-Trolltech Qt graphical user interface system, along with utilization of the "scons" software build environment that makes this possible. An initial scons configuration has been completed, and the AspenV3 prototype is now operating on three platforms: Windows, Linux , and Mac OSX operating systems. The initial prototypes have been tested for basic functionality and will be soon be available to JHT point of contacts and collaborators for further testing.

3)NCAR-EOL has recently hired an additional software engineer to work on this project. The software engineer holds Master's degrees in both computer science and meteorology and thus is ideal suited for this project. He will devote about half of his time to the unified dropsonde software package

Near-term Goals

1)A synoptic analyses and visualization feature will be added to ASPENV3. This functionality is currently found in Editsonde, and is the most often requested new feature for ASPEN.

2) An "auto-save" feature, which automatically saves the quality control output products, will be added to ASPENV3.

3)Additional editing capability of ASPEN V3 will be developed based upon recommendations from the collaborators and JHT point of contacts.

4) Work will begin on the development of an automated validation system, which will provide an objective method for comparing processing results between Editsonde and ASPENV3. It will also provide a method for validating software modifications to the unified software package as development continues in future years.

2010 Hurricane season plans for ASPENV3:

The prototype software will NOT be used operationally this summer except for:

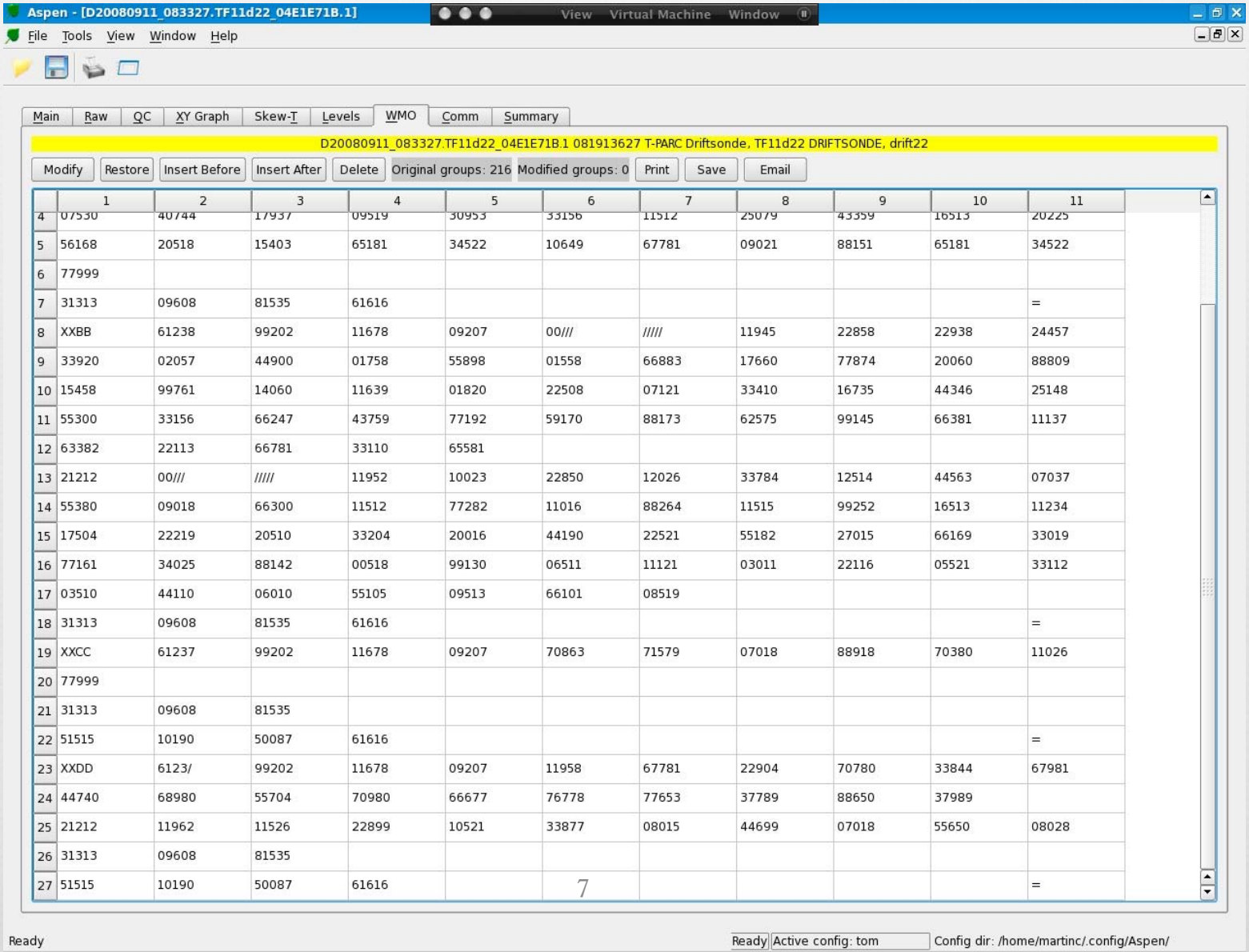
1)Ground processing of the raw dropsonde files from the NASA Global Hawk dropsonde system (research flights)

2)Possibly for the NASA DC-8 dropsondes as well*

3)Possibly for NOAA P3 operational and research missions*

* To date plans have not been finalized for dropsonde processing for aircraft involved in field campaigns this summer (PREDICT, GRIP, IFEX). Other factors besides the availability and functionality of ASPENV3 are involved

ASPENV3 screen shots: Linux



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4	07530	40744	17937	09519	30953	33156	11512	25079	43359	16513	20225
5	56168	20518	15403	65181	34522	10649	67781	09021	88151	65181	34522
6	77999										
7	31313	09608	81535	61616							=
8	XXBB	61238	99202	11678	09207	00///	/////	11945	22858	22938	24457
9	33920	02057	44900	01758	55898	01558	66883	17660	77874	20060	88809
10	15458	99761	14060	11639	01820	22508	07121	33410	16735	44346	25148
11	55300	33156	66247	43759	77192	59170	88173	62575	99145	66381	11137
12	63382	22113	66781	33110	65581						
13	21212	00///	/////	11952	10023	22850	12026	33784	12514	44563	07037
14	55380	09018	66300	11512	77282	11016	88264	11515	99252	16513	11234
15	17504	22219	20510	33204	20016	44190	22521	55182	27015	66169	33019
16	77161	34025	88142	00518	99130	06511	11121	03011	22116	05521	33112
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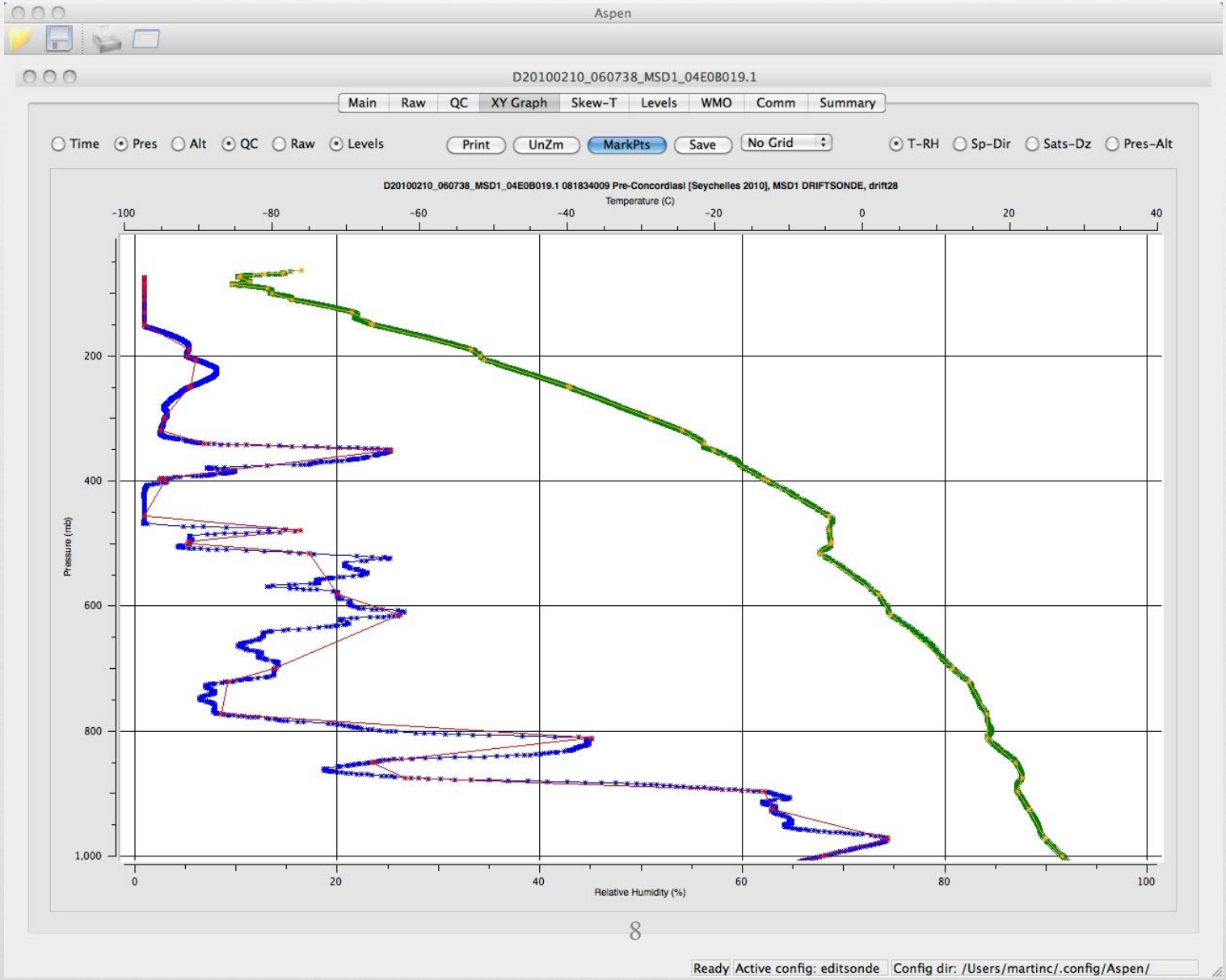
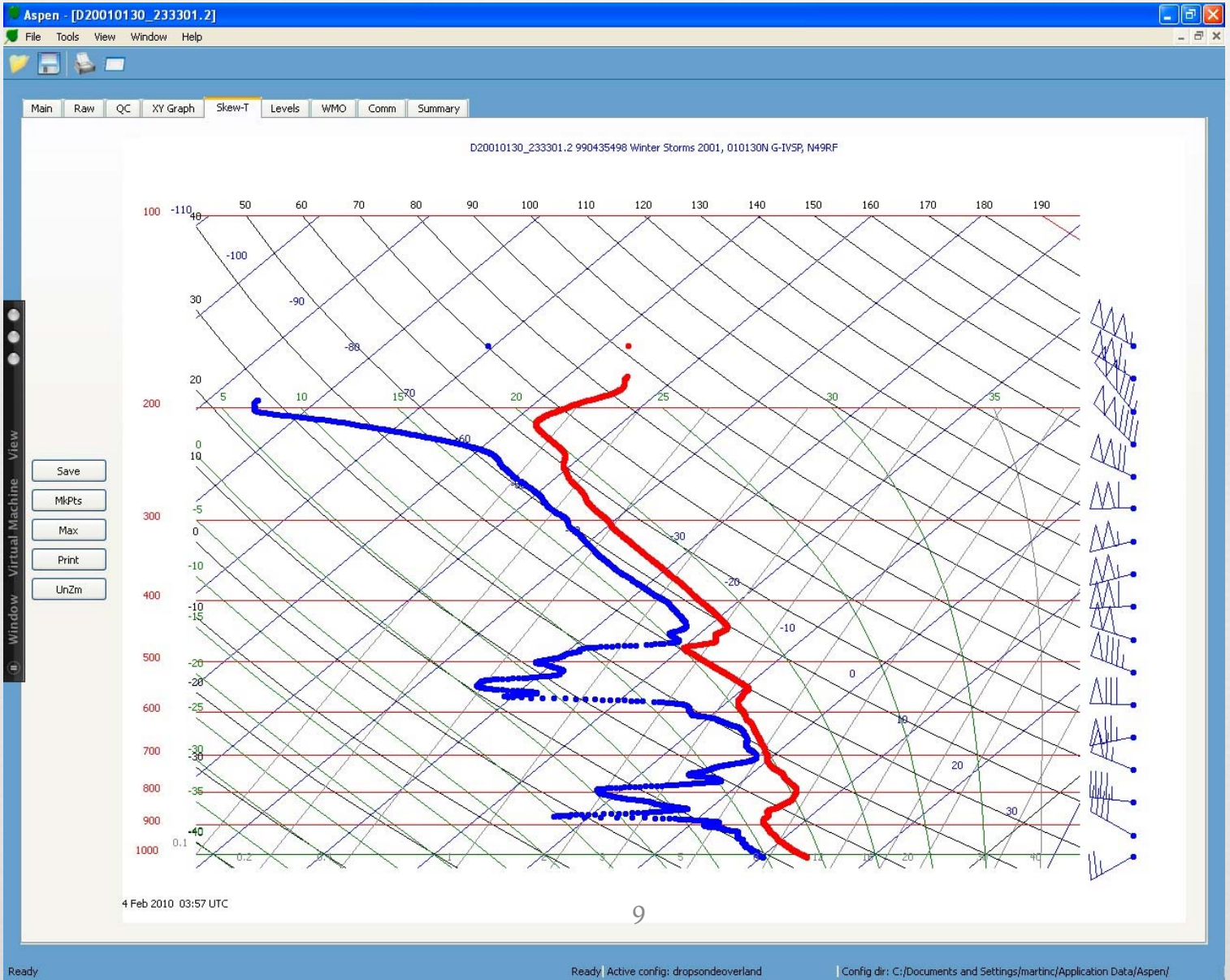
18	31313	09608	81535	61616							=
19	XXCC	61237	99202	11678	09207	70863	71579	07018	88918	70380	11026
20	77999										
21	31313	09608	81535								
22	51515	10190	50087	61616							=
23	XXDD	6123/	99202	11678	09207	11958	67781	22904	70780	33844	67981
24	44740	68980	55704	70980	66677	76778	77653	37789	88650	37989	
25	21212	11962	11526	22899	10521	33877	08015	44699	07018	55650	08028
26	31313	09608	81535								
27	51515	10190	50087	61616							=

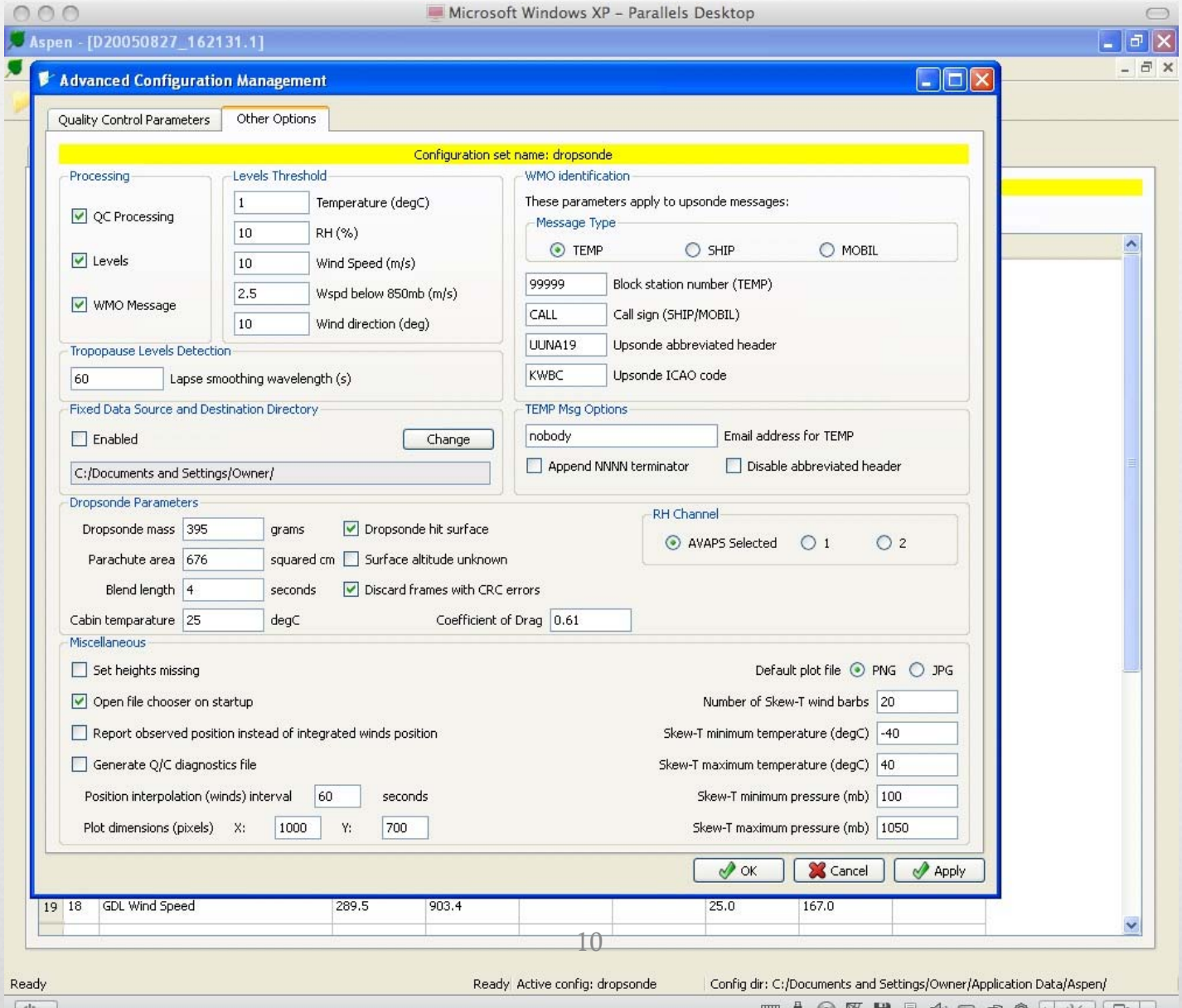
ASPENV3 screen shots: Mac OSX



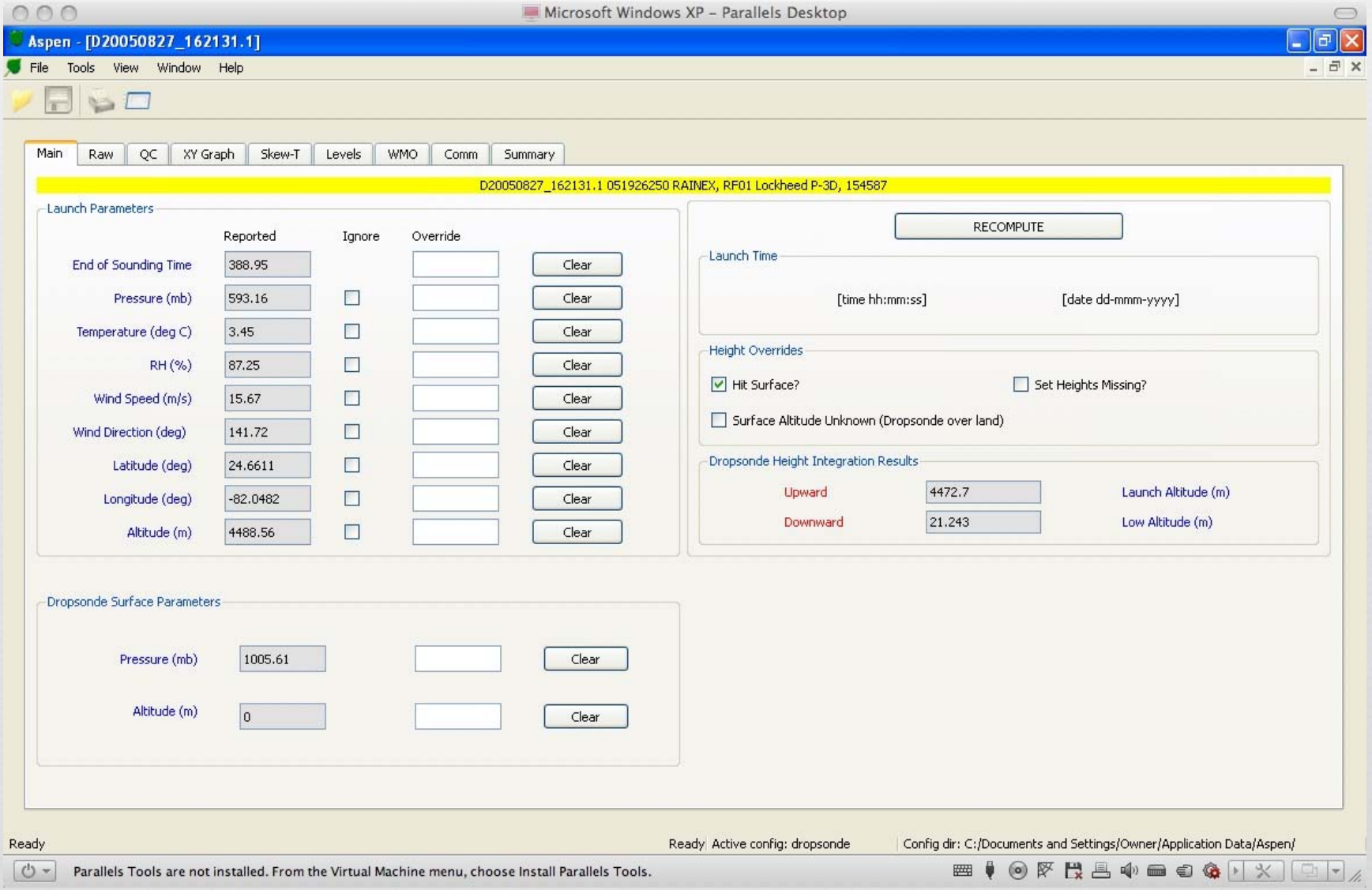
ASPENV3 screen shots: Windows XP



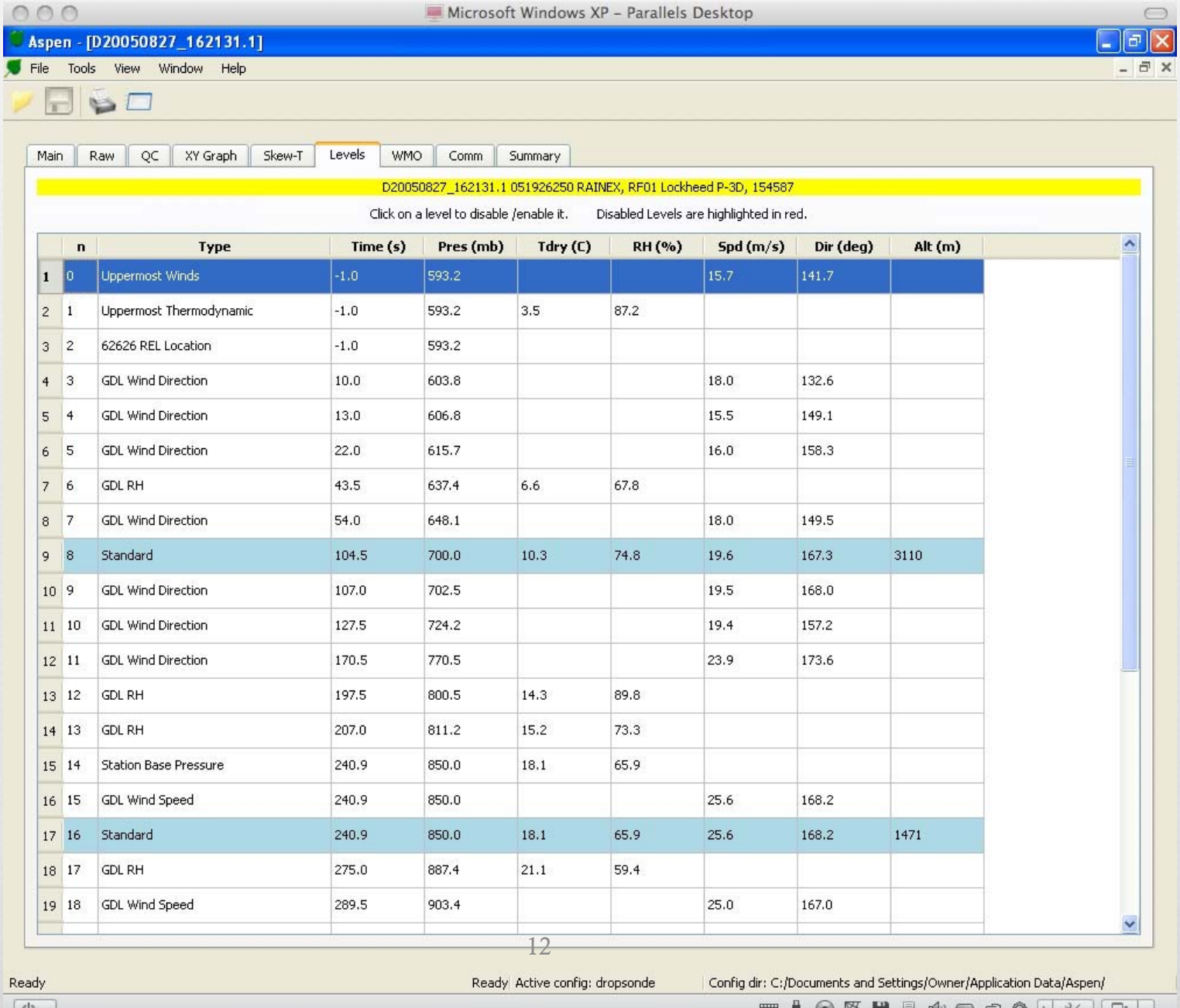
ASPENV3 screen shots: Windows XP



ASPENV3 screen shots: Windows XP



ASPENV3 screen shots: Windows XP



	n	Type	Time (s)	Pres (mb)	Tdry (C)	RH (%)	Spd (m/s)	Dir (deg)	Alt (m)
1	0	Uppermost Winds	-1.0	593.2			15.7	141.7	
2	1	Uppermost Thermodynamic	-1.0	593.2	3.5	87.2			
3	2	62626 REL Location	-1.0	593.2					
4	3	GDL Wind Direction	10.0	603.8			18.0	132.6	
5	4	GDL Wind Direction	13.0	606.8			15.5	149.1	
6	5	GDL Wind Direction	22.0	615.7			16.0	158.3	
7	6	GDL RH	43.5	637.4	6.6	67.8			
8	7	GDL Wind Direction	54.0	648.1			18.0	149.5	
9	8	Standard	104.5	700.0	10.3	74.8	19.6	167.3	3110
10	9	GDL Wind Direction	107.0	702.5			19.5	168.0	
11	10	GDL Wind Direction	127.5	724.2			19.4	157.2	
12	11	GDL Wind Direction	170.5	770.5			23.9	173.6	
13	12	GDL RH	197.5	800.5	14.3	89.8			
14	13	GDL RH	207.0	811.2	15.2	73.3			
15	14	Station Base Pressure	240.9	850.0	18.1	65.9			
16	15	GDL Wind Speed	240.9	850.0			25.6	168.2	
17	16	Standard	240.9	850.0	18.1	65.9	25.6	168.2	1471
18	17	GDL RH	275.0	887.4	21.1	59.4			
19	18	GDL Wind Speed	289.5	903.4			25.0	167.0	