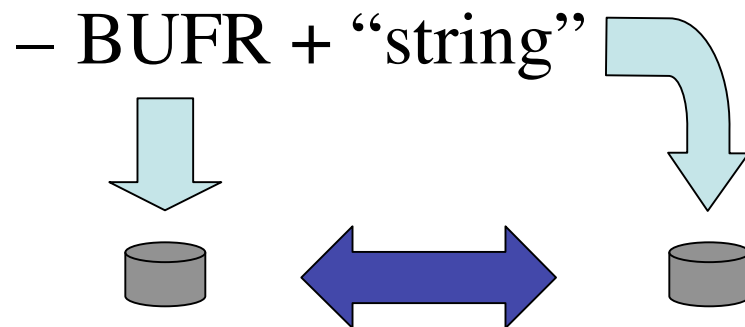


Review of the BUFR Template for Ship Data

Presentation for ETMC-I/Doc. 3.2
(Scott Woodruff, NOAA, USA)

General review — based on comparisons using NCEP BUFR

- Earlier (March 1997 data) comparisons
 - temperature biases (from 273.15 K constant)
 - i_w omitted; calm/variable winds; cloud amts
- Recent comparisons for ICOADS real-time (RT) archive: March 1997-December 2002



FM 13-XI Ext. SHIP

SECTION 0 $M_i M_j M_j M_j M_j$ D D****
or
A₁b_wn_bn_bn_b** YYGGi_w Iiiii*
or
99L_aL_aL_a Q_cL_oL_oL_oL_o**** } MMMU_{La}U_{Lo}*** h_oh_oh_oh_oi_m***

SECTION 1 i_Ri_xhVV Nddff (00fff) 1s_nTTT 2s_nT_dT_dT_d
or
29UUU } 3P_oP_oP_oP_o

4PPPP
or
4a₃hhh 5appp 6RRRt_R 7wwW₁W₂
or
7w_aw_aW_{a1}W_{a2} 8N_hC_LC_MC_H 9GGgg

SECTION 2 222D_sV_s (0s_sT_wT_wT_w) (1P_{wa}P_{wa}H_{wa}H_{wa}) (2P_wP_wH_wH_w) ((3d_{w1}d_{w1}d_{w2}d_{w2})

(4P_{w1}P_{w1}H_{w1}H_{w1}) (5P_{w2}P_{w2}H_{w2}H_{w2}) (6I_sE_sE_sR_s
or ICING +
plain language)

(70H_{wa}H_{wa}H_{wa}) (8s_wT_bT_bT_b) (ICE + c_iS_ib_iD_iz_i
or
plain language)

SECTION 3 333 (0) (1s_nT_xT_xT_x) (2s_nT_nT_nT_n) (3Ejjj) (4E'sss) (5j₁j₂j₃j₄ (j₅j₆j₇j₈j₉)

(6RRRt_R) (7R₂₄R₂₄R₂₄R₂₄) (8N_sCh_sh_s) (9S_pS_pS_pS_p)

(80000 (0) (1))

SECTION 4 444 N'C'H'H'C_t

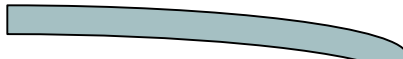
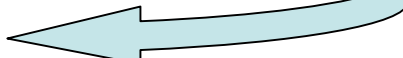
SECTION 5 555 Groups to be developed nationally

Blue boxes enclose fields translated (limited scope)

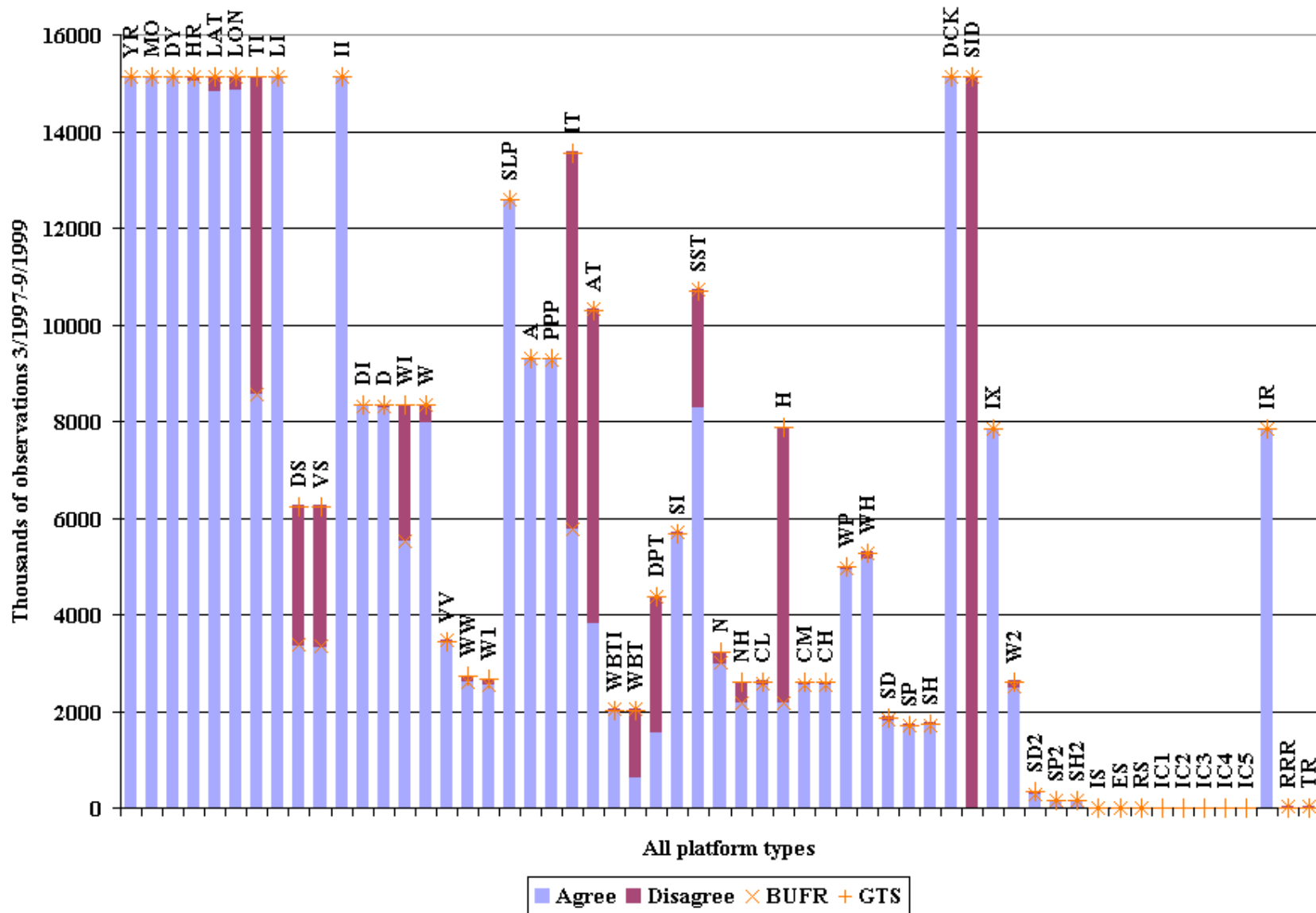
FM 18-XII BUOY

SECTION 0	M _i M _i M _j M _j	<table border="0" style="width: 100%;"> <tr> <td style="width: 25%;">A₁b_wn_bn_bn_b</td> <td style="width: 25%;">YYMMJ</td> <td style="width: 25%;">GGggi_w</td> <td style="width: 25%;">Q_cL_aL_aL_aL_aL_a</td> </tr> <tr> <td>L_oL_oL_oL_oL_oL_o</td> <td colspan="3">(6Q_iQ_tQ_A/)</td> </tr> </table>	A ₁ b _w n _b n _b n _b	YYMMJ	GGggi _w	Q _c L _a L _a L _a L _a L _a	L _o L _o L _o L _o L _o L _o	(6Q _i Q _t Q _A /)																		
A ₁ b _w n _b n _b n _b	YYMMJ	GGggi _w	Q _c L _a L _a L _a L _a L _a																							
L _o L _o L _o L _o L _o L _o	(6Q _i Q _t Q _A /)																									
SECTION 1	(111Q _d Q _x	<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Oddff</td> <td style="width: 30%;">1s_nTTT</td> <td rowspan="2" style="width: 10%; text-align: center; vertical-align: middle;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">2s_nT_dT_dT_d</div> or <div style="border: 1px solid black; padding: 2px; display: inline-block;">29UUU</div> </td> <td rowspan="2" style="width: 30%; vertical-align: middle;">3P₀P₀P₀P₀</td> </tr> <tr> <td>4PPPP</td> <td>5appp)</td> </tr> </table>	Oddff	1s _n TTT	<div style="border: 1px solid black; padding: 2px; display: inline-block;">2s_nT_dT_dT_d</div> or <div style="border: 1px solid black; padding: 2px; display: inline-block;">29UUU</div>	3P ₀ P ₀ P ₀ P ₀	4PPPP	5appp)																		
Oddff	1s _n TTT	<div style="border: 1px solid black; padding: 2px; display: inline-block;">2s_nT_dT_dT_d</div> or <div style="border: 1px solid black; padding: 2px; display: inline-block;">29UUU</div>	3P ₀ P ₀ P ₀ P ₀																							
4PPPP	5appp)																									
SECTION 2	(222Q _d Q _x	<table border="0" style="width: 100%;"> <tr> <td style="width: 25%;">0s_nT_wT_wT_w</td> <td style="width: 25%;">1P_{wa}P_{wa}H_{wa}H_{wa}</td> <td style="width: 25%;">20P_{wa}P_{wa}P_{wa}</td> <td style="width: 25%;">21H_{wa}H_{wa}H_{wa})</td> </tr> </table>	0s _n T _w T _w T _w	1P _{wa} P _{wa} H _{wa} H _{wa}	20P _{wa} P _{wa} P _{wa}	21H _{wa} H _{wa} H _{wa})																				
0s _n T _w T _w T _w	1P _{wa} P _{wa} H _{wa} H _{wa}	20P _{wa} P _{wa} P _{wa}	21H _{wa} H _{wa} H _{wa})																							
SECTION 3	(333Q _{d1} Q _{d2}	<table border="0" style="width: 100%;"> <tr> <td style="width: 20%;">(8887k₂</td> <td style="width: 20%;">2z₀z₀z₀z₀</td> <td style="width: 20%;">3T₀T₀T₀T₀</td> <td style="width: 20%;">4S₀S₀S₀S₀</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td></td> <td>2z_nz_nz_nz_n</td> <td>3T_nT_nT_nT_n</td> <td>4S_nS_nS_nS_n)</td> </tr> <tr> <td>(66k₆9k₃</td> <td>2z₀z₀z₀z₀</td> <td>d₀d₀c₀c₀c₀</td> <td></td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> <td></td> </tr> <tr> <td></td> <td>2z_nz_nz_nz_n</td> <td>d_nd_nc_nc_nc_n)</td> <td></td> </tr> </table>	(8887k ₂	2z ₀ z ₀ z ₀ z ₀	3T ₀ T ₀ T ₀ T ₀	4S ₀ S ₀ S ₀ S ₀		2z _n z _n z _n z _n	3T _n T _n T _n T _n	4S _n S _n S _n S _n)	(66k ₆ 9k ₃	2z ₀ z ₀ z ₀ z ₀	d ₀ d ₀ c ₀ c ₀ c ₀				2z _n z _n z _n z _n	d _n d _n c _n c _n c _n)	
(8887k ₂	2z ₀ z ₀ z ₀ z ₀	3T ₀ T ₀ T ₀ T ₀	4S ₀ S ₀ S ₀ S ₀																							
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(66k ₆ 9k ₃	2z ₀ z ₀ z ₀ z ₀	d ₀ d ₀ c ₀ c ₀ c ₀																								
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	2z _n z _n z _n z _n	d _n d _n c _n c _n c _n)																								
SECTION 4	(444	<table border="0" style="width: 100%;"> <tr> <td style="width: 20%;">(1Q_PQ₂Q_{TW}Q₄)</td> <td style="width: 20%;">(2Q_NQ_LQ_AQ_Z)</td> <td rowspan="2" style="width: 60%; text-align: center; vertical-align: middle;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">(Q_cL_aL_aL_aL_aL_a L_oL_oL_oL_oL_oL_o)</div> or (YYMMJ GGgg/) </td> </tr> <tr> <td>(3Z_nZ_nZ_nZ_n</td> <td>(4Z_cZ_cZ_cZ_c)</td> <td>(5B_tB_tX_tX_t)</td> </tr> <tr> <td colspan="3">(6A_nA_nA_nA_n) (7V_BV_Bd_Bd_B) (8V_iV_iV_iV_i) (9/Z_dZ_dZ_d)</td> </tr> </table>	(1Q _P Q ₂ Q _{TW} Q ₄)	(2Q _N Q _L Q _A Q _Z)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">(Q_cL_aL_aL_aL_aL_a L_oL_oL_oL_oL_oL_o)</div> or (YYMMJ GGgg/)	(3Z _n Z _n Z _n Z _n	(4Z _c Z _c Z _c Z _c)	(5B _t B _t X _t X _t)	(6A _n A _n A _n A _n) (7V _B V _B d _B d _B) (8V _i V _i V _i V _i) (9/Z _d Z _d Z _d)																	
(1Q _P Q ₂ Q _{TW} Q ₄)	(2Q _N Q _L Q _A Q _Z)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">(Q_cL_aL_aL_aL_aL_a L_oL_oL_oL_oL_oL_o)</div> or (YYMMJ GGgg/)																								
(3Z _n Z _n Z _n Z _n	(4Z _c Z _c Z _c Z _c)		(5B _t B _t X _t X _t)																							
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SECTION 5	(555 Groups to be developed nationally)																									

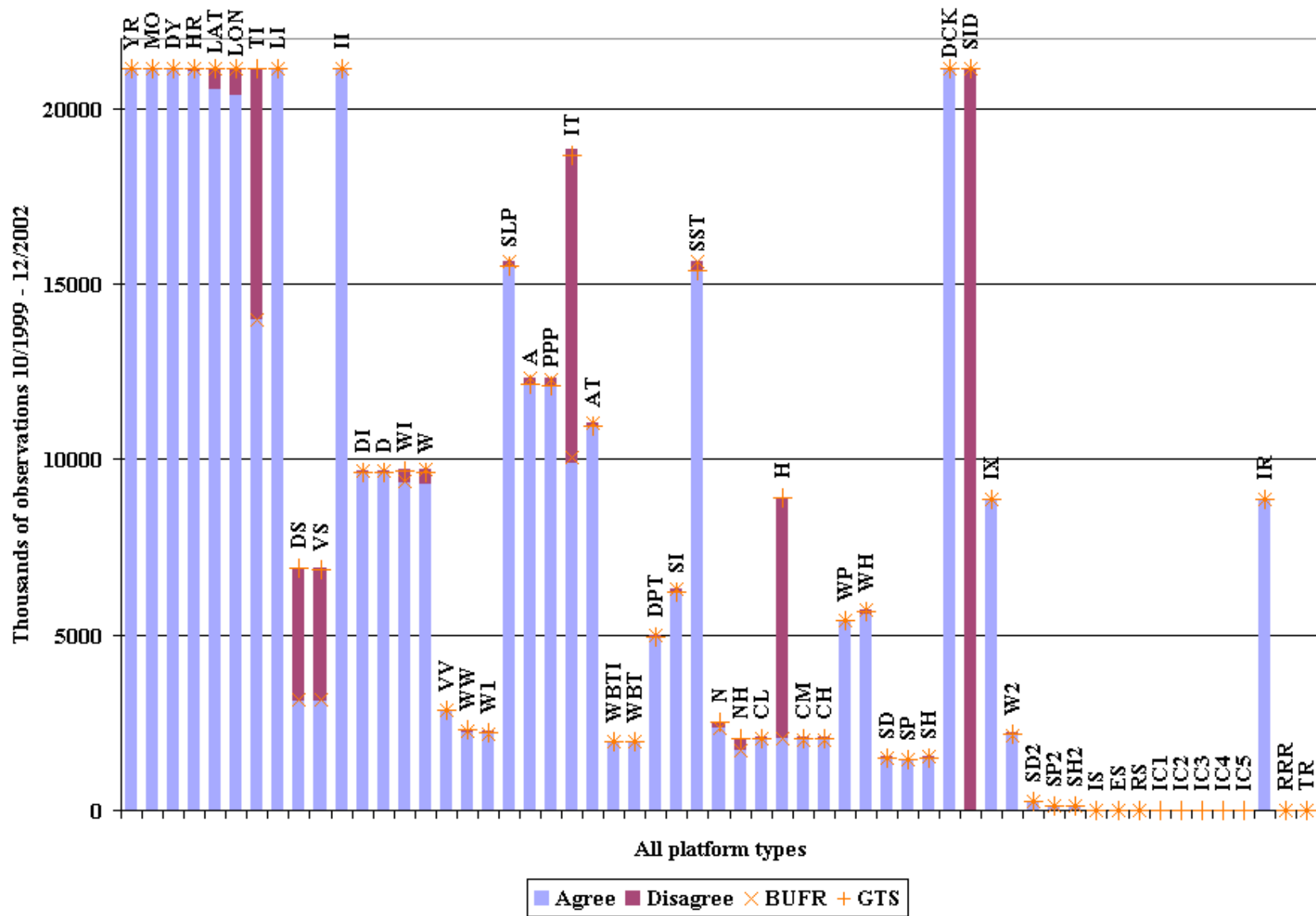
Field by field comparisons: Early (9/97-9/99) vs. Late (10/99-02)

- Compare the two translations
 - BUFR \Rightarrow IMMA 
 - string \Rightarrow IMMA 
- Scope was limited to selected fields
- Some fields expected to disagree e.g.:
 - SID (source ID): 100%
 - TI (time indicator), IT (temps indic.)
- Differences mostly not investigated

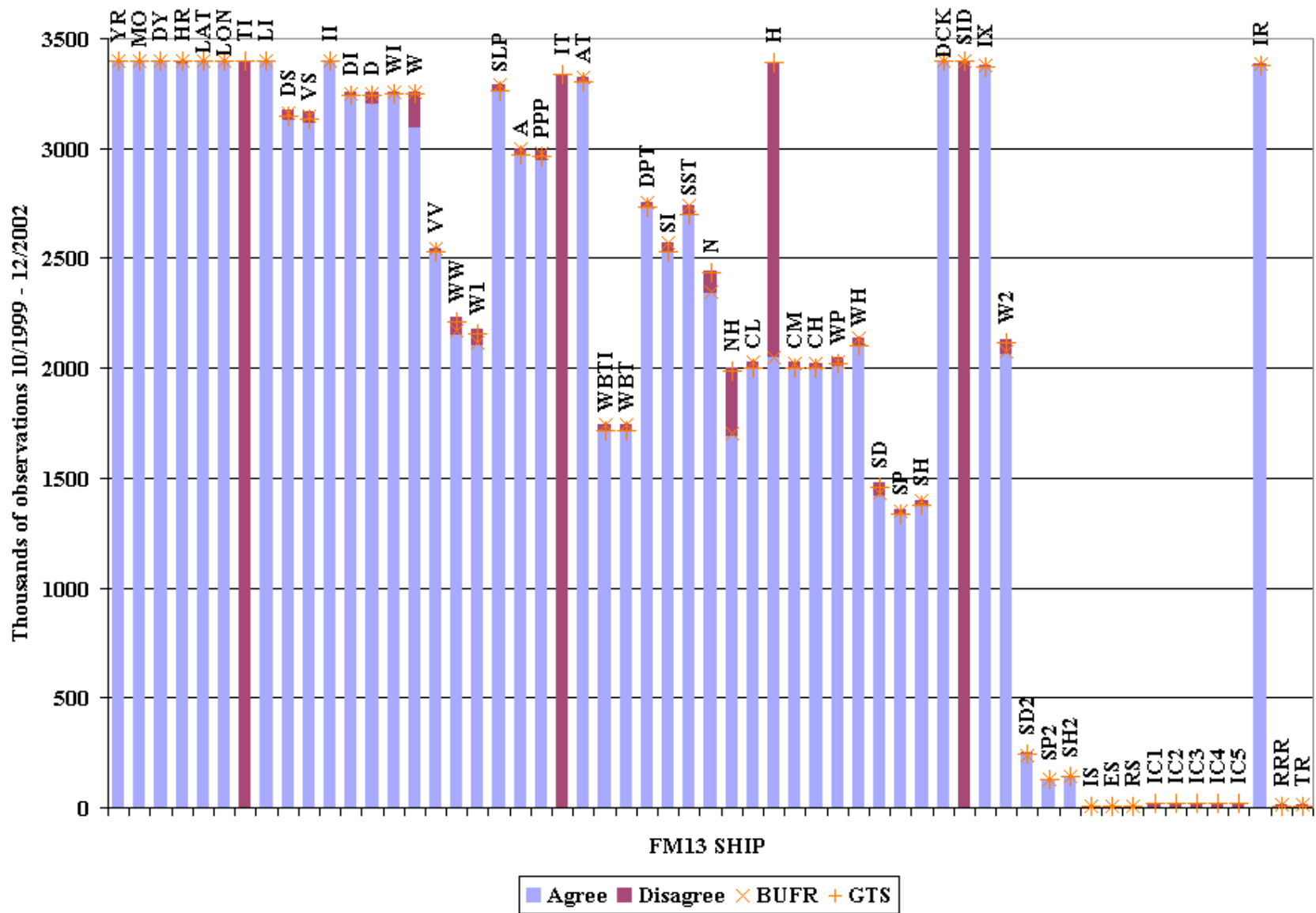
Early period (worse): all platforms



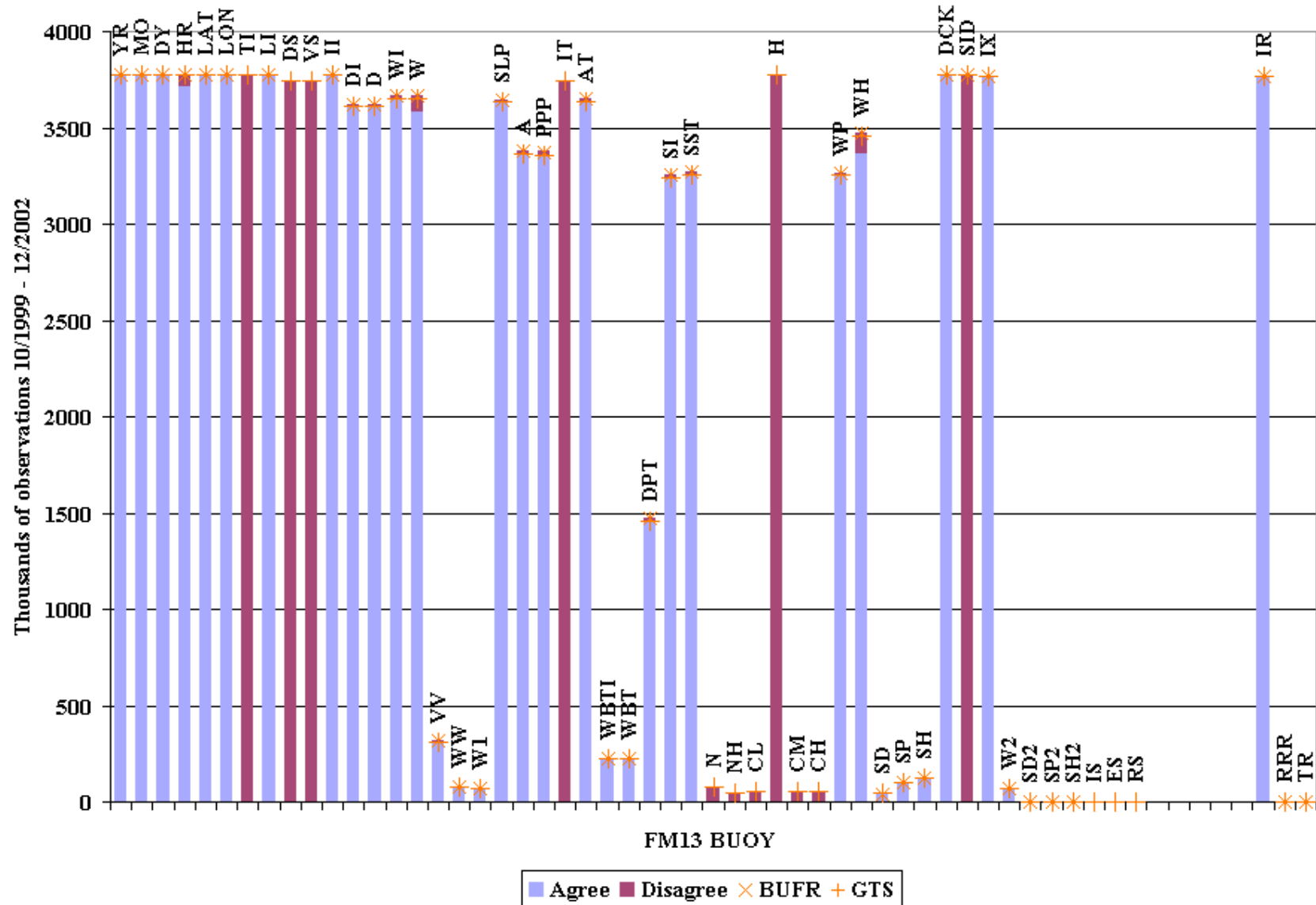
Late period (better): all platforms



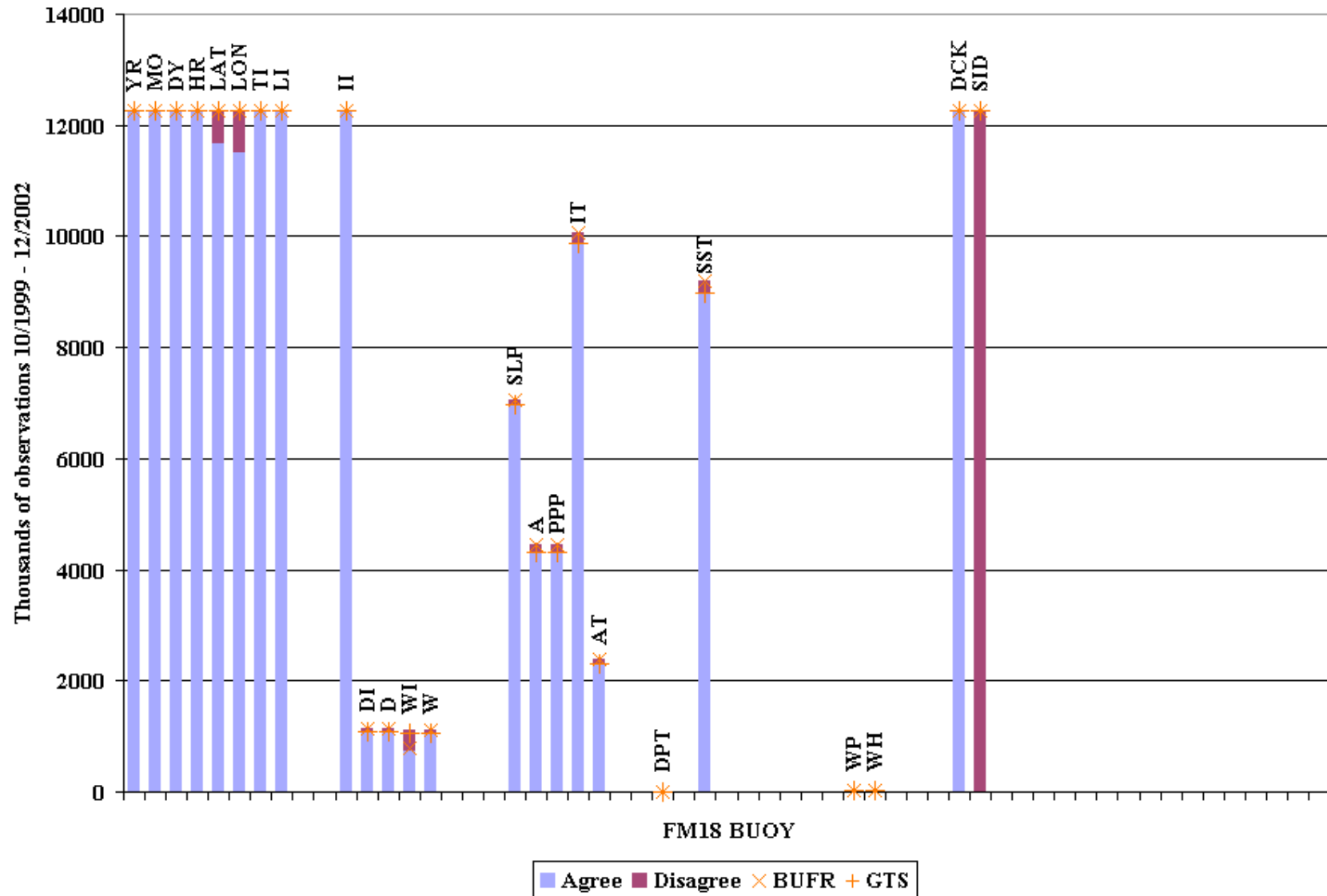
Late period: FM13 SHIP



Late period: FM13 BUOY



Late period: FM18 BUOY



General comparison findings

- Data problems/omissions in NCEP/BUFR
- E.g. some cloud codes
- Some problems may be trivial differences
- Main data elements usually seem OK
 - Except for special codes, e.g., wind direction variable (FM 13: dd = 99) — not in BUFR?
- Retention by NCEP of the original GTS string was critical—make part of template?