

Results from first CO2 cleaning of WHT Primary mirror after its aluminisation, following 25 nights on sky for optical tests during Standdown. Aluminisation was on 3 April, followed immediately by WEAVE Standdown and Covid-19 confinement. Calima occurred with dust concentration 20-60 ug/m3 (TNG meter) during AGBP test on nights of 2, 3 and 5th July and again 6,7,8th. This means mirror was exposed to 3 nights (typically 6 hrs each) of significant dust levels before each of the measurement series shown below.

	Temp. °C	wavelength of band (nm)							"Dust Indices"							
		365	404	464	522	624	760	970	365	404	464	522	624	760	970	
Monday after 3 nights calima																
1668	6/7/20 8:37:59 left	21.3	92.1	90.5	90.1	90.2	89.1	86.3	92.0	2.8	2.6	2.8	2.2	2.6	2.3	2.7
1669	6/7/20 8:38:55 left	21.5	92.1	90.5	90.1	90.1	89.1	86.2	92.0	2.9	2.8	2.9	2.3	2.7	2.3	2.7
1670	6/7/20 8:40:10 top	21.8	92.0	90.5	90.1	90.1	89.1	86.2	91.8	2.9	2.8	2.9	2.3	2.6	2.3	2.7
1671	6/7/20 8:41:30 right	22.1	92.0	90.4	90.0	90.1	89.0	86.2	91.8	2.9	2.9	2.9	2.4	2.7	2.4	2.8
1672	6/7/20 8:42:21 right	22.4	92.0	90.3	89.7	90.1	88.8	86.0	91.7	2.9	2.9	3.1	2.3	2.9	2.4	2.8
1673	6/7/20 8:43:45 bottom	22.7	92.0	90.3	89.8	90.0	89.0	86.0	91.8	3.3	3.3	3.5	2.6	3.0	2.7	2.7
1674	6/7/20 8:45:04 bottom	22.9	92.1	90.5	90.1	90.1	89.1	86.2	91.9	3.0	2.8	2.9	2.3	2.7	2.3	2.6
	averages		92.0	90.4	90.0	90.1	89.0	86.2	91.9	3.0	2.9	3.0	2.3	2.7	2.4	2.7
	range		0.1	0.2	0.4	0.2	0.3	0.3	0.3	0.5	0.7	0.7	0.4	0.4	0.4	0.2
	change v. Alum.		-0.8	-0.8	-0.9	-0.8	-0.9	-0.7	-0.7	0.5	0.6	0.9	0.8	1.2	1.2	1.6

Friday, more calima, before & after CO2

1675	10/7/20 8:43:26 left	21.9	91.3	89.7	89.4	89.4	88.3	85.4	91.2	3.4	3.2	3.6	2.9	3.6	3.2	3.7
1676	10/7/20 8:44:15 left	22	91.7	90.0	89.6	89.6	88.6	85.6	91.3	3.5	3.3	3.5	2.9	3.6	3.2	3.3
1677	10/7/20 8:45:22 top	22.1	91.6	90.1	89.6	89.6	88.6	85.7	91.3	3.3	3.2	3.4	2.9	3.5	3.1	3.6
1678	10/7/20 8:46:10 top	22.1	91.4	89.8	89.3	89.4	88.3	85.4	91.0	3.6	3.9	3.9	3.3	4.1	3.5	4.0
1679	10/7/20 8:47:16 right	22.4	91.6	90.1	89.6	89.7	88.6	85.7	91.3	3.2	3.1	3.4	2.8	3.4	3.0	3.6
1680	10/7/20 8:49:25 bottom	22.6	91.8	90.2	89.8	89.7	88.7	85.8	91.2	3.3	3.0	3.3	2.7	3.4	2.9	3.5
1681	10/7/20 8:50:16 bottom	22.8	91.7	90.2	89.7	89.7	88.7	85.7	91.2	3.1	3.1	3.3	2.8	3.3	3.0	3.4
	averages		91.6	90.0	89.6	89.6	88.5	85.6	91.2	3.3	3.3	3.5	2.9	3.6	3.1	3.6
	range		0.5	0.5	0.5	0.3	0.4	0.4	0.3	0.5	0.9	0.6	0.6	0.8	0.6	0.7
	avg. change		-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.6	0.4	0.4	0.5	0.6	0.8	0.7	0.9
	max change		-0.7	-0.7	-0.7	-0.7	-0.7	-0.8	-0.9	0.6	1.0	0.9	1.0	1.4	1.1	1.3
	Total change due to calima (6 x 6h)		-1.3	-1.3	-1.3	-1.3	-1.4	-1.4	-1.6	0.9	1.1	1.4	1.4	2.1	2.1	2.6

After CO2:

1682	10/7/20 12:21:36 left	23.3	92.6	91.0	90.6	90.7	89.7	86.8	92.5	2.2	2.0	2.0	1.5	1.7	1.3	1.5
1683	10/7/20 12:22:36 left	23.3	92.3	90.8	90.4	90.4	89.5	86.6	92.1	2.6	2.3	2.3	1.8	1.9	1.5	1.8
1684	10/7/20 12:23:30 left	23.4	92.6	91.1	90.6	90.7	89.7	86.8	92.4	2.3	2.1	2.1	1.6	1.6	1.2	1.4
1685	10/7/20 12:24:37 top	23.4	92.5	91.0	90.5	90.6	89.7	86.7	92.3	2.4	2.2	2.2	1.6	1.7	1.4	1.4
1686	10/7/20 12:25:29 top	23.6	92.3	90.8	90.4	90.4	89.5	86.5	92.0	2.8	2.6	2.6	2.0	2.2	1.8	2.0
1687	10/7/20 12:26:21 top	23.7	92.5	91.0	90.6	90.6	89.7	86.7	92.2	2.3	2.0	1.9	1.4	1.5	1.1	1.2
1688	10/7/20 12:27:30 right	23.9	92.2	90.6	90.2	90.2	89.2	86.2	91.7	3.0	2.9	2.9	2.3	2.7	2.3	2.5
1689	10/7/20 12:28:24 right	24	92.6	91.0	90.6	90.7	89.7	86.7	92.2	2.3	2.1	2.0	1.5	1.6	1.2	1.3
1690	10/7/20 12:29:13 right	24.1	92.5	90.9	90.4	90.5	89.6	86.5	92.0	2.6	2.4	2.4	1.8	2.0	1.6	1.8
1691	10/7/20 12:30:30 bottom	24.4	92.3	90.8	90.3	90.4	89.4	86.5	91.9	2.7	2.5	2.6	2.0	2.2	1.8	1.9
1692	10/7/20 12:31:23 bottom	24.5	92.2	90.7	90.2	90.3	89.3	86.3	91.7	2.6	2.5	2.6	2.0	2.3	2.0	2.2
1693	10/7/20 12:32:16 bottom	24.7	92.6	91.1	90.6	90.7	89.7	86.7	92.2	2.4	2.1	2.1	1.4	1.6	1.2	1.3
	averages		92.4	90.9	90.5	90.5	89.6	86.6	92.1	2.5	2.3	2.3	1.7	1.9	1.5	1.7
	range		0.4	0.5	0.4	0.5	0.5	0.6	0.8	0.8	0.9	1.0	0.9	1.2	1.2	1.3
	average change due to CO2		0.8	0.9	0.9	0.9	1.0	1.0	0.9	-0.8	-0.9	-1.2	-1.2	-1.6	-1.6	-1.9
	average change since Aluminizing		-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.5	0.0	0.1	0.2	0.2	0.4	0.4	0.6

Conclusion: CO2 has recovered ~2/3 of Reflectivity lost since Aluminising. M1 remains 0.5% lower in %R and ~0.5% in Scattering, but only in red.

CO2 has recovered about 1%R, a little more of the average reflectivity loss due to the 3 nights of calima immediately before cleaning (0.5%)

Hence it has not only removed the dust accumulated recently, but also part of that accumulated in the previous months.

Calima caused loss of reflectivity ~ 0.8% in all wavebands in each of two periods of exposure at ~50 ug/m3 (TNG) of about 3 nights long.

Calima also caused increase in scattering ~ 1%, rising to 1.5% towards red wavebands.

As usual, the reflectivity measurements are much more variable after cleaning than before, showing the patchy non-uniform results of CO2.