

## **Supplementary Materials**

Here we provide three tables showing correlations between the annually averaged ozone as measured at various measurement sites at 150 hPa, 500 hPa and the surface between 1990 and 2009.

**Table S1:** Correlations between the annually averaged ozone record for measurements sites at 150 hPa from 1990-2009. Details on the various sites are given in Table 1. Correlations significant at the 90% level as evaluated with a 2-sides Student's T test are given in bold, those significant at the 95% level are additionally underlined.

	Alert	Edmonton	Resolute	Churchill	Goosebay	Eureka	Kagoshima	Tateno	Sapporo	Wallops	Ny Alesund	Scoresbysund	Sodankyla	Madrid	Debilt	Hohenpeissenburg	Legionowo	Lindenberg	Payerne
<b>Edmonton</b>	<b>.66</b>																		
<b>Resolute</b>	<b>.75</b>	<b>.68</b>																	
<b>Churchill</b>	<b>.74</b>	<b>.68</b>	<b>.74</b>																
<b>Goosebay</b>	<b>.60</b>	<b>.55</b>	<b>.68</b>	<b>.67</b>															
<b>Eureka</b>	<b>.85</b>	<b>.80</b>	<b>.67</b>	<b>.70</b>	<b>.58</b>														
<b>Kagoshima</b>	-.06	-.26	-.17	-.16	-.20	-.06													
<b>Tateno</b>	-.30	.0	-.15	-.01	-.05	-.23	<b>.00</b>												
<b>Sapporo</b>	.36	.31	.34	.37	.26	.33	-.23	<b>.27</b>											
<b>Wallop</b> s	.24	.31	.13	.0	-.11	.06	.08	.03	<b>-.11</b>										
<b>Ny Alesund</b>	<b>.85</b>	<b>.83</b>	<b>.71</b>	<b>.72</b>	<b>.67</b>	<b>.87</b>	-.24	-.20	.32	<b>.07</b>									
<b>Scoresbysund</b>	<b>.80</b>	<b>.85</b>	<b>.67</b>	<b>.74</b>	.47	<b>.81</b>	.13	-.28	.38	-.03	<b>.82</b>								
<b>Sodankyla</b>	<b>.80</b>	<b>.77</b>	<b>.67</b>	<b>.63</b>	<b>.46</b>	<b>.82</b>	-.28	-.27	.37	.24	<b>.85</b>	<b>.83</b>							
<b>Madrid</b>	.50	.38	.55	.14	.39	.42	.52	-.04	.16	.29	.39								
<b>Debilt</b>	<b>.82</b>	<b>.88</b>	.66	<b>.78</b>	.57	<b>.79</b>	-.05	-.40	.20	.17	<b>.91</b>	<b>.77</b>	<b>.83</b>	.26					
<b>Hohenpeissenburg</b>	<b>.66</b>	<b>.55</b>	<b>.61</b>	<b>.68</b>	.35	<b>.54</b>	-.17	.23	<b>.59</b>	.26	<b>.61</b>	<b>.55</b>	<b>.59</b>	.39	.53				
<b>Legionowo</b>	<b>.57</b>	<b>.54</b>	.35	<b>.55</b>	.20	<b>.44</b>	.33	.16	.39	.19	<b>.59</b>	<b>.71</b>	<b>.49</b>	.22	<b>.64</b>	<b>.69</b>			
<b>Lindenberg</b>	<b>.51</b>	<b>.50</b>	.47	<b>.54</b>	.16	.34	-.02	.25	<b>.75</b>	.07	<b>.47</b>	<b>.59</b>	<b>.50</b>	-.01	.43	<b>.88</b>	<b>.68</b>		
<b>Payerne</b>	<b>.67</b>	<b>.85</b>	<b>.62</b>	<b>.70</b>	.22	<b>.71</b>	-.18	.18	.46	.45	<b>.71</b>	<b>.68</b>	<b>.67</b>	<b>.71</b>	<b>.71</b>	<b>.88</b>	<b>.75</b>	<b>.88</b>	

**Table S2:** Correlations between the annually averaged ozone for measurements sites at 500 hPa for 1990-2009. Also included is the Jungfraujoch surface site at 3580 m. Details on the various sites are given in Table S1. Correlations significant at the 90% level as evaluated with a 2-sides Student's T test are given in bold, those significant at the 95% level are additionally underlined

	Alert	Edmonton	Resolute	Churchill	Goosebay	Eureka	Kagoshima	Tateno	Sapporo	MOZAIC-JP	Wallop	MOZAIC-US	Ny Alesund	Scoresbysund	Sodankylä	Madrid	Debilt	Hohenpeissenburg	Legionowo	Lindenberg	Payerne	MOZAIC-EU	Jungfraujoch	
Edmonton	<b>.67</b>																							
Resolute	<b>.64</b>	<b>.66</b>																						
Churchill	<b>.75</b>	<b>.61</b>	<b>.72</b>																					
Goosebay	<b>.53</b>	<b>.58</b>	.42	<b>.49</b>																				
Eureka	<b>.65</b>	<b>.64</b>	<b>.66</b>	<b>.49</b>	<b>.46</b>																			
Kagoshima	-.29	-.38	-.03	-.06	<b>-.44</b>	-.29																		
Tateno	-.12	.16	.28	.16	.10	.10	<b>.53</b>																	
Sapporo	-.01	-.09	.23	-.01	-.26	.25	<b>.62</b>	<b>.41</b>																
MOZAIC-JP	-.23	.31	.55	.03	.05	.25	.38	<b>.77</b>	.42															
Wallop	-.05	.22	.16	.32	.33	-.27	.37	<b>.48</b>	.00	<b>.79</b>														
MOZAIC-US	-.21	.37	.53	.03	.15	.43	.33	.47	.28	<b>.74</b>	<b>.59</b>													
Ny Alesund	<b>.50</b>	<b>.64</b>	<b>.83</b>	<b>.68</b>	.36	<b>.52</b>	.13	<b>.41</b>	.10	.36	.26	<b>.50</b>												
Scoresbysund	<b>.58</b>	<b>.56</b>	<b>.72</b>	.34	.31	<b>.81</b>	-.17	.09	.27	.45	-.13	<b>.66</b>	<b>.68</b>											
Sodankylä	<b>.65</b>	<b>.61</b>	.30	.37	<b>.45</b>	<b>.54</b>	-.31	-.06	-.14	.25	.09	.32	<b>.60</b>	<b>.72</b>										
Madrid	-.48	-.11	.27	.02	-.24	.00	.31	-.13	-.15	.03	.01	.36	.44	<b>.70</b>	.11									
Debilt	.24	-.15	-.25	-.10	.22	-.27	-.07	<b>-.47</b>	-.38	-.26	.29	-.17	-.27	-.21	.13	-.07								
Hohenpeissenburg	.27	.07	-.19	-.03	-.34	.14	-.23	-.28	.04	-.41	<b>-.46</b>	-.43	-.05	.04	.29	-.19	-.24							
Legionowo	<b>.45</b>	.19	<b>.66</b>	.35	.02	.33	.18	-.05	.22	.01	-.03	.16	<b>.56</b>	<b>.52</b>	<b>.45</b>	<b>.55</b>	-.01	.14						
Lindenberg	<b>.61</b>	.36	.36	<b>.63</b>	.13	.13	-.02	-.12	-.09	-.38	.00	-.51	.40	.14	.41	-.02	.22	<b>.47</b>	.40					
Payerne	<b>.58</b>	.32	.33	<b>.63</b>	.08	-.01	.24	.13	.24	-.09	.34	-.17	.37	-.03	.26	-.42	.39	.33	.22	<b>.79</b>				
MOZAIC-EU	-.04	<b>.42</b>	.37	.01	.42	<b>.43</b>	-.03	.19	.02	<b>.63</b>	<b>.61</b>	<b>.83</b>	.26	<b>.60</b>	.34	.06	.10	<b>-.46</b>	.00	-.47	-.27		<b>MOZAIC-EU</b>	
Jungfraujoch	<b>.66</b>	<b>.73</b>	<b>.67</b>	<b>.61</b>	<b>.54</b>	<b>.78</b>	-.14	.24	-.11	.43	.27	<b>.60</b>	<b>.68</b>	<b>.85</b>	<b>.48</b>	.16	-.05	-.15	.35	.33	.26	<b>.68</b>		

Table S3: Correlations between the annually averaged ozone for selected surface measurement sites for 1990-2009. Details on the various sites are given in Table 1. Correlations significant at the 90% level as evaluated with a 2-sides Student's T test are given in bold, those significant at the 95% level are additionally underlined. Note that for the Macehead site the baseline ozone data is used.

	Macehead	Egbert	Payerne	Rigi	Ryori	Sonnbllich
Egbert	0.39					
Payerne	<b>0.53</b>	0.36				
Rigi	<b>0.82</b>	0.39	<b>0.88</b>			
Ryori	<b>0.65</b>	0.18	<b>0.66</b>	<b>0.68</b>		
Sonnbllich	<b>0.78</b>	0.22	<b>0.67</b>	<b>0.84</b>	0.31	
JungfrauJoch	<b>0.83</b>	<b>0.52</b>	<b>0.78</b>	<b>0.88</b>	<b>0.78</b>	<b>0.78</b>

