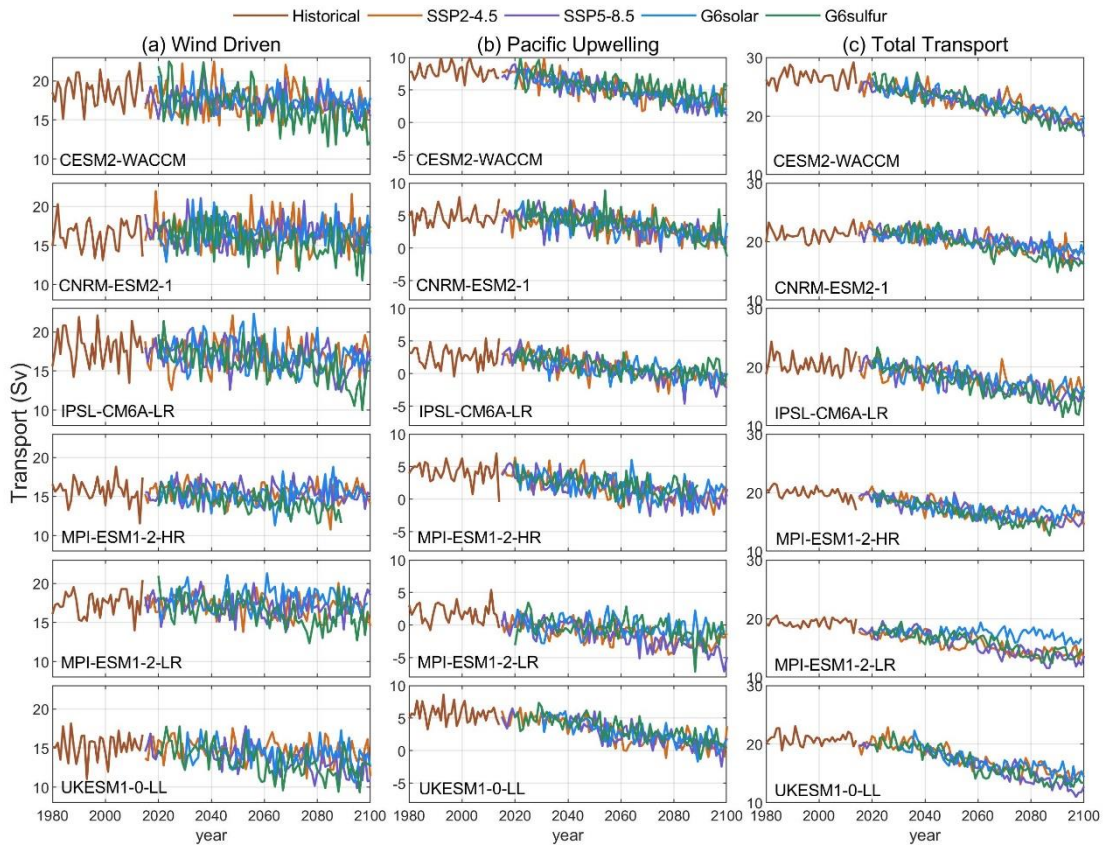


1 **Supplementary Information**

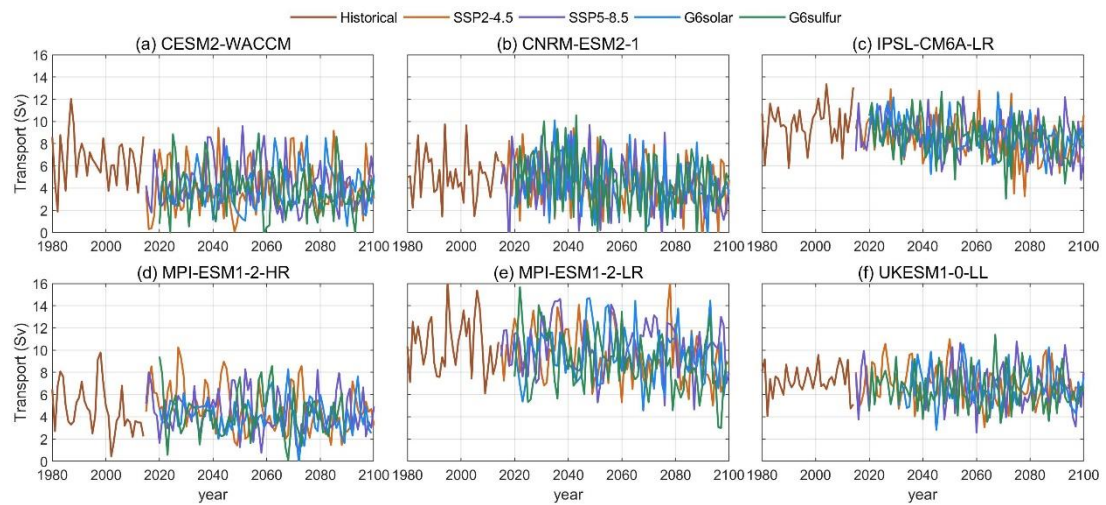
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4 **Figure S1.** (a) the time series of ITF transport in the six ESMs for wind driven  
5 component under different scenarios. (b) as Figure S1a for Pacific upwelling  
6 contribution. (c) as Figure S1a for total ITF transport under Amended Island Rule.

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9 **Figure S2.** The ITF transport in the six ESMs by buoyancy forcing during 1980-2100

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12 Table S1

13 The differences in ITF Transport (2020-2100) and its components for six models;  $TRN_{wind}$  is the ITF14 transport derived from Island Rule;  $TRN_{Upwelling}$  is the area integral of Pacific upwelling rate at 1500m;15  $TRN_{Total}$  is the ITF transport calculating by Amended Island Rule;  $TRN_{Buoyancy}$  is the ITF transport by16 buoyancy forcing. Unit: Sv ( $1Sv = 10^6 m^3/s$ )

Differences		CESM2- WACCM	CNRM- ESM2-1	IPSL- CM6A- LR	MPI- ESM1-2- HR	MPI- ESM1-2- LR	UKESM1-0- LL
G6solar – SSP2-4.5	$TRN_{Wind}$	0.01	-0.11	-0.07	-0.16	<b>0.76</b>	-0.33
	$TRN_{Upwelling}$	-0.04	0.23	0.03	0.25	<b>1.17</b>	0.32
	$TRN_{Total}$	-0.03	0.12	-0.04	0.09	<b>1.93</b>	-0.02
	$TRN_{Buoyancy}$	-0.27	0.08	0.35	-0.6	0.18	-0.14
G6sulfur – SSP2-4.5	$TRN_{Wind}$	<b>-0.8</b>	<b>-0.92</b>	<b>-1.05</b>	<b>-0.95</b>	<b>-0.65</b>	<b>-1.34</b>
	$TRN_{Upwelling}$	<b>0.5</b>	0.36	0.29	0.34	<b>0.99</b>	<b>0.58</b>
	$TRN_{Total}$	-0.31	<b>-0.56</b>	<b>-0.76</b>	<b>-0.61</b>	<b>0.34</b>	<b>-0.76</b>
	$TRN_{Buoyancy}$	-0.49	0.25	0.15	-0.41	-0.55	-0.4
G6solar – SSP5-8.5	$TRN_{Wind}$	0.11	0.02	0.25	-0.21	<b>0.63</b>	<b>0.64</b>
	$TRN_{Upwelling}$	0.15	-0.01	0.22	0.44	<b>1.29</b>	0.25
	$TRN_{Total}$	0.26	0.01	<b>0.46</b>	0.22	<b>1.92</b>	0.89
	$TRN_{Buoyancy}$	-0.17	0.08	0.05	-0.23	<b>-0.6</b>	-0.06
G6sulfur – SSP5-8.5	$TRN_{Wind}$	<b>-0.7</b>	<b>-0.79</b>	<b>-0.74</b>	<b>-1.11</b>	<b>-0.78</b>	-0.37
	$TRN_{Upwelling}$	<b>0.68</b>	0.12	<b>0.48</b>	0.55	<b>1.12</b>	<b>0.51</b>
	$TRN_{Total}$	-0.02	<b>-0.67</b>	-0.27	<b>-0.57</b>	<b>0.33</b>	0.14
	$TRN_{Buoyancy}$	-0.39	0.25	-0.15	-0.07	<b>-1.34</b>	-0.33
G6sulfur – G6solar	$TRN_{Wind}$	<b>-0.81</b>	<b>-0.81</b>	<b>-0.99</b>	<b>-0.82</b>	<b>-1.41</b>	<b>-1.01</b>
	$TRN_{Upwelling}$	<b>0.53</b>	0.13	0.26	0.23	-0.18	0.26
	$TRN_{Total}$	-0.28	<b>-0.68</b>	<b>-0.72</b>	<b>-0.59</b>	<b>-1.59</b>	<b>-0.75</b>
	$TRN_{Buoyancy}$	0.22	0.17	-0.21	0.20	<b>-0.74</b>	-0.27

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