Table 1: Linear trends of contribution of TWSA, LWSA, $LWSA_{clim}$, $LWSA_{hum}$, $LWSA_{res}$, $LWSA_{abs}$ to ocean mass change over three periods (1948–1975, 1976–2002 and 2003–2016). Positive trends translate to ocean mass gain, whereas negative trends translate to ocean mass loss. Ensemble ranges are given in parentheses. Estimates are given in millimetres of sea level equivalent per year (mm SLE yr^{-1}).

Component	**Linear trend mm SLE yr^{-1}**		
	1948–1975	**1976–2002**	**2003–2016**
Total water storage anomaly (TWSA)	0.18 (0.13 to 0.23)	0.58 (0.49 to 0.66)	1.18 (1.06 to 1.30)
Land water storage anomaly (LWSA)	-0.20 (-0.25 to -0.15)	0.21 (0.12 to 0.29)	0.41 (0.29 to 0.52)
Climate-driven land water storage anomaly ($LWSA_{clim}$)	-0.13 (-0.15 to -0.10)	0.01 (-0.02 to 0.04)	0.04 (-0.03 to 0.10)
Human-driven land water storage anomaly ($LWSA_{hum}$)	-0.08 (-0.10 to -0.05)	0.19 (0.14 to 0.25)	0.37 (0.30 to 0.45)
Land water storage anomaly due to reservoirs ($LWSA_{res}$)	-0.21	-0.10 (-0.11 to -0.10)	-0.02 (-0.03 to -0.02)
Land water storage anomaly due to water abstraction ($LWSA_{abs}$)	0.14 (0.12 to 0.17)	0.30 (0.25 to 0.35)	0.39 (0.33 to 0.46)

Table 2: Overview of model variants used in this study. The standard version of WaterGAP2.2d (Wg_std) and a non-standard version which implicitly includes glaciers (Wg_gl) were run under four types of model configuration ("anthropogenic", "anthropogenic without reservoirs", "anthropogenic without water abstraction" and "naturalized"), two climate forcings differing in terms of precipitation bias correction (based on GPCC or CRU), and two assumptions related to consumptive irrigation water use ("70% deficit" and "optimal").

Model version	**Model configuration**	**Precipitation bias correction [PREC]**	**Consumptive irrigation water use [IRR]**	**Model variant name**	**Number of model variants**
Standard WaterGAP (Wg_std)	Anthropogenic	GPCC[1] / CRU[2]	70% deficit (irr70) / optimal (irr100)	WGHM_std_ant_[PREC]_[IRR]	4
Integrated WaterGAP (Wg_gl)	Anthropogenic	GPCC[1] / CRU[2]	70% deficit (irr70) / optimal (irr100)	WGHM_gl_ant_[PREC]_[IRR]	4
	Anthropogenic without reservoirs	GPCC[1] / CRU[2]	70% deficit (irr70) / optimal (irr100)	WGHM_gl_ant_nores_[PREC]_[IRR]	4
	Anthropogenic without water abstraction	GPCC[1] / CRU[2]		WGHM_gl_ant_noabs_[PREC]	2
	Naturalized	GPCC[1] / CRU[2]		WGHM_gl_nat_[PREC]	2

[1] Schneider et al. (2015). [2] Harris et al. (2014).

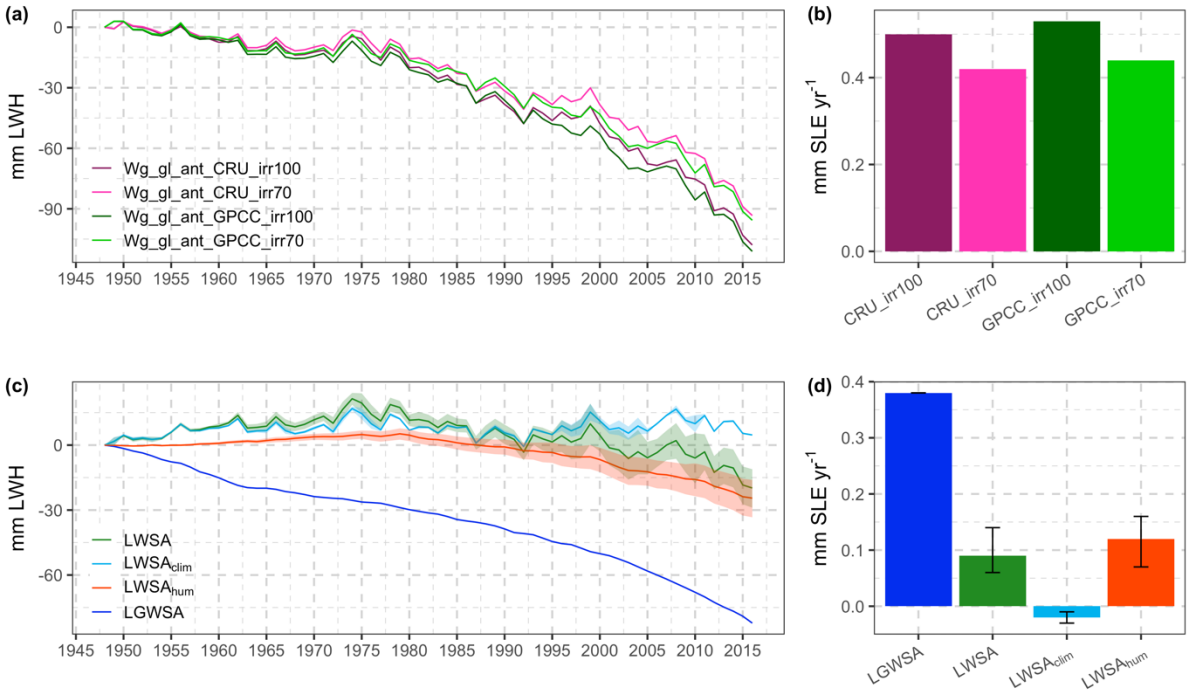

Figure 1: Global annual TWSA and individual contributions, 1958 to 2016. TWSA were computed with four variants of integrated WaterGAP in anthropogenic mode (Table 1) and disaggregated into anomalies of land glacier water storage (LGWSA) and land water storage (LWSA). LWSA were further disaggregated into anomalies of climate-driven land water storage ($LWSA_{clim}$) and human-driven land water storage ($LWSA_{hum}$). (a) Time series of TWSA and (b) corresponding linear trends of contribution of TWSA to ocean mass change over 1948–2016. (c) Time series of LWSA, $LWSA_{clim}$, $LWSA_{hum}$ and LGWSA (for each ensemble, the curve represents the ensemble mean and the shaded area around the curve represents the ensemble minimum and maximum values) and (d) corresponding linear trends (ensemble ranges are represented as errorbars). Anomalies are relative to the year 1948 and given in millimetres of land water height (mm LWH). Trends are given in millimetres of sea level equivalent per year (mm SLE yr^{-1}); positive trends translate to ocean mass gain, whereas negative trends translate to ocean mass loss.