Understanding the contemporary global carbon balance and its implications for monitoring emissions

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http://www.globalcarbonproject.org/carbonbudget/
Global emissions for 2017: 36.6 ± 2 GtCO₂

Initial estimate for 2017 +1.5% (0.7 to 2.4%)

2016: 36.2 Gt CO₂

Global emissions for 2017: 36.6 ± 2 GtCO₂


Source: CDIAC; Le Quéré et al 2017; Peters et al. 2017; Global Carbon Budget 2017; Fig. R. Andrew CICERO
Global carbon budget

estimates of global emissions
closely match the nearly-independent
estimates of global sinks
(good!)

Source: CDIAC; NOAA-ESRL; Houghton and Nassikas 2017; Hansis et al 2015; Joos et al 2013; Khatiwala et al. 2013; DeVries 2014; Le Quéré et al 2017; Global Carbon Budget 2017; Fig. R. Andrew CICERO
Carbon budget imbalance (the ‘gaps’)

The budget imbalance is the carbon left after adding estimates for total emissions, minus the atmospheric growth rate and estimates for the land and ocean carbon sinks using models constrained by observations.

Source: Le Quéré et al 2017; Global Carbon Budget 2017

Major data & understanding issues to be resolved:

• better energy statistics incl. carbon content of coal
• better land-cover/change statistics incl. sub-country transitions, harvest, peat burning, consistent definitions!
• more data on vegetation biomass incl. soils, rainfall access!! and understanding ecosystem responses
• more data on ocean pCO₂ with smart sensors, higher model resolution for better physics
• continuous atmospheric CO₂ data essential

Next steps: 5-year Carbon Budget to inform the stocktake; 3 GHGs

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