

### 1.2.2. Focus on Verification, Requested Under the Kyoto Protocol: But What Does Verification Mean?

As mentioned in Section 1.1.3, verification is strictly defined as to *what net emissions the atmosphere actually sees*, meaning that bottom-up (e.g., inventory-based) reporting has to be checked with the help of independent top-down atmospheric measurements.

This requires applying the concept of bottom up–top down verification – or consistent Full Carbon Accounting (**FCA**) – on the spatial scale of countries, i.e., the measurement of all fluxes, including those into and out of the atmosphere (as observed on earth), but also an atmospheric storage measurement (as observed in the atmosphere), which would — to respond to the needs of the Kyoto Protocol — permit to discriminate a country's *Kyoto biosphere* from its *non-Kyoto biosphere*. This type of FCA would permit verification, which is ideal because it works bottom up–top down (*two-sided* or *dual-constrained* verification). However, it is unattainable as there is no atmospheric measurement available (and will also not be available in the immediate future), which can satisfy this requirement (Jonas *et al.*, 2000; Jonas and Nilsson 2001: Sections 3.1.2 and 3.1.5; see also Richards and Andersson, 2001).<sup>1</sup>

This is the reason why a FCA, which is necessary but not sufficient, substitutes consistent FCA: It is a FCA, which excludes the atmospheric storage measurement on the spatial scale of countries and can only be applied and verified temporally (*one-sided* verification). In essence, this inferior FCA only considers the temporal measurement of fluxes as observed on earth.<sup>2</sup>

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<sup>1</sup> Richards, K.R. and K.P. Andersson (2001). What is in the Sink? Technological Support for National Inventories of Forest Carbon. Draft Paper. School of Public and Environmental Affairs, Indiana University, Bloomington, IN, USA. Available on the Internet: <http://www.spea.indiana.edu/richards/Research/WhatisintheSink-Draft13.pdf>.

<sup>2</sup> In this context, it is noted that the measurement of changes in a biospheric stock represents, from a physical point of view, a not necessarily consistent measurement of the involved net flux.