

Interesting to see ESSD take on manuscripts describing authors' 'vision' rather than their data. Will other groups seek similar exposure? Those problems remain for future authors and editors. For now, we want this first one to set very good example.

Fundamentally, I applaud authors efforts to push climate community forward. Our community needs and deserves such a push. Without changes such as described here, community will flounder, eventually (if not already) proving irrelevant to most research. I recommend publication in ESSD.

For this reviewer, the manuscript misses key audiences.

First, however, we must deal with AI ('artificial intelligence' in authors' words), which I label instead as 'machine-assisted discovery and learning' (MADL). I adopt generic terminology to make a fundamental point: our data-rich (data-overwhelmed?) science explored these tools and depended on these technologies for a very long time. This reviewer encountered neural networks back during the 1980s. AI emerged recently in social and political spheres but oceanographers, confronting rich but periodic geographically-isolated data, have long applied advanced statistical techniques (random forests, neural networks, automated cluster analyses, etc.). ESSD published, in 2018, a MADL study of ocean carbon states (<https://doi.org/10.5194/essd-10-609-2018>). More recently, many ESSD publications, often exploring satellite data within Google Earth Engine (GEE), describe MADL applied to land cover changes in challenging regions. Instead of treating AI as new and potentially frightful, EVE authors should suggest positive ways forward. What benchmarks? What inter-comparisons? ESSD (with GMD) attempted a special issue focussed on MADL benchmarks, which brought forward a tropospheric ozone example. What data will prove most in need or most amendable to AI? Should we start from air quality, ocean mixing, satellite NDVI, anthropogenic CO2 emissions? This group - who better - should make recommendations. Otherwise readers gain nothing beyond additional cautious mention of AI. Readers do not need to find exact plans but need assurances of valid approach. Inside, outside, on-top, underlying? Instead of platitudes, readers will want to learn how EVE community intends to help us all adopt and use MADL to increase access to high quality certified data. Fast moving technology, no doubt, but our community has long history of finding, testing and applying these tools.

Many readers will respond positively to EVE mantra of "entirely new and inherently better" and to its laudable social justice intents. But, same readers, finding EVE white paper in ESSD, will wonder about data, education, young researchers, etc.

Technical innovation? Good. But what will EVE provide to researchers at their desks? Easy access? Better documentation? Recognizable formats? One hopes for all of the above, but one finds little information. Will all data reside at one EVE repository, such as used for CMIP? Doubtful, and probably unworkable. If distributed repositories, will EVE finally solve interoperability? 'FAIR' tried but failed; how does EVE propose to approach this challenge? Use GEE approach? If so, how will EVE assure provenance(s)? For researcher who might need historical, present and future ocean surface winds, plankton abundance, and mixed layer carbon export, will they turn to EVE for best reliable information? EVE might aspire to serve as that source but most readers will need assurance that EVE understands the need and proposes valid approach to solve the problem. "Integrate observations" via "digital commons"? Most ESSD readers have read those phrases too many times. Other than good intentions, anything new or different, here?

EVE hopes to "train and employ new developers and users of climate information globally". Good, very positive. Many readers, however, will again have read such laudable intentions before. What does EVE propose to do differently? How will EVE crack publish or perish mentality that haunts (or, discourages) many young researchers? Despite aged luminaries

among co-author list, this reviewer and many readers wonder: why did such an initiative not emerge from young scientists? From YESS, for example? Too many young researchers drop out. Others, having survived initial years, find few reasons for change. What new education, enticement, enrichment or employment models might emerge from EVE? Must we address past educational failures in order to achieve essential equity and climate solutions? This reviewer and many readers suppose 'yes' to that question but we fail to find helpful directions or solutions among EVE documentation.

I envision short example: scientist involved in managing or remediating a mountain stream. Mountain stream might flow from Rocky Mountains of North America, from Alps of Europe or from Tibetan Plateau of Asia. Analysis effort might focus on short upstream stretch but stream will join larger stream will join river might join larger river to eventually deliver sediments, nutrients, contaminants (perhaps including radionuclides) to ocean. Upstream, our researcher might confront atmospheric deposition, acid runoff from mine tailings, agricultural and village waste inputs, relict channelization, fish ladders, etc., and may employ drone-based remote sensing on meter to kilometer scales. That researcher may know ESSD for its descriptions of global streamflow data or for descriptions of and access to relevant data on comparable streams, and perhaps even for riverine terms in carbon or nitrogen cycles. They may calculate seasonal snow-melt inputs from (someone else's) hydrological model forced by downscaled precipitation data from a national GCM. For their own use and for information relevant to their user community, they need (at minimum) local data on present and future (one or two seasons) streamflows, nutrient regime, contaminant sources, benthic productivity and nutrient recycling, bed flows, tree falls, channel engineering, etc., as well as on past protection or logging. Farther upstream, a helpful environmental group might introduce beavers. Colleagues might monitor riparian land forms or local forestry or agriculture practices. Her or his observed catchment might include grassland or forest fires. They will undoubtedly worry about funding; securing and ensuring funding might represent key portion of employment responsibility. If, within the interest zone of ECMWF and ECMWF's climate change services, will our researcher use reanalysis data? In a different region, might they turn to NOAA? What does EVE offer to this (these) researcher(s)? How do they know about EVE? If they glanced at this initial description in ESSD, will they have shown interest? Not without substantial revisions, in view of this reviewer.

Sorry for so many questions. Particularly as applied to an initiative that I basically support, that I think climate community needs. But, for this reviewer and for many readers, EVE resembles only the latest of long line of well-framed well-intentioned but unfunded initiatives. Apparently, EVE considers itself unique among the research community plus, as a consequence, the holder and source of unique solutions. Good! But, provide sufficient detail to prove your point? A more-focused plan, built around tangible example(s), seems much needed.