The Confluence of Wine and Ocean Currents:
Oenological Forcing of Climate Science Interactions.

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Scientific productivity in oceanography and climatology is often instigated by collaborations forged by mutual affinities for vinicultural product assessment and enjoyment. Antoine Badan had a deep understanding of this effect as evidenced by his outstanding wine-making skills and his extensive coterie of productive scientific collaborators with enthusiastic oenological interests.

Previous studies have addressed the important issue of climate forcing of the quality of wines. For example, I once noted in a seminar that a simple ENSO index correlated well with highly rated wines in the California regions (Fig. 1). This is an intuitively appealing and plausible result.

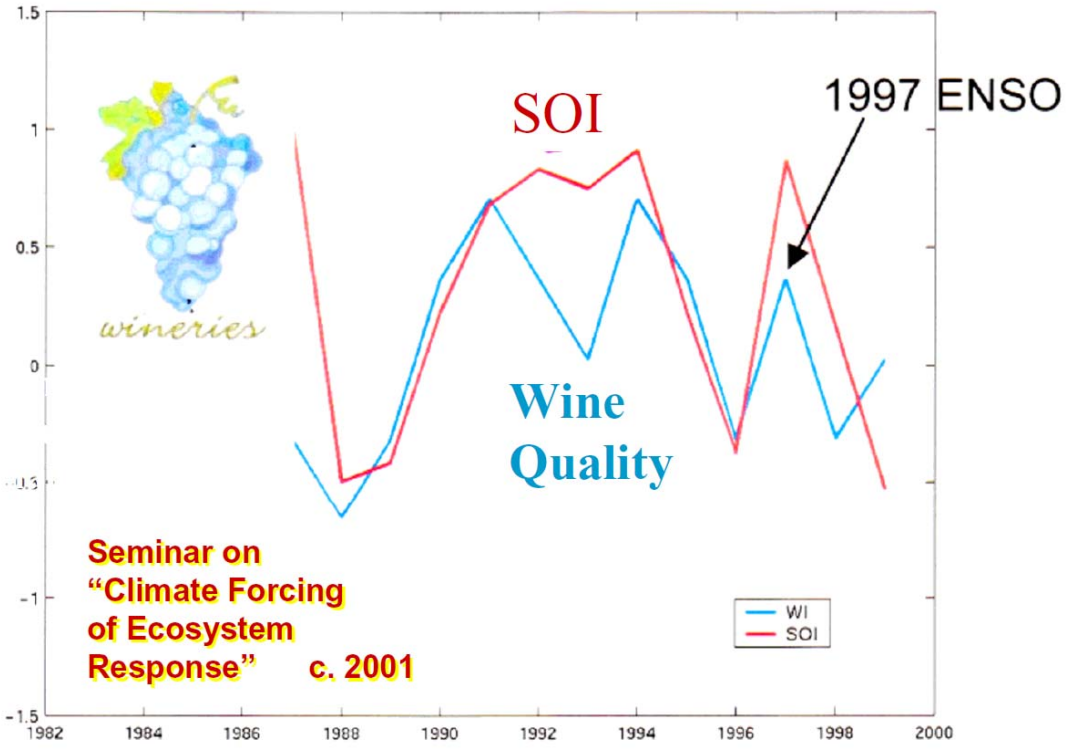

Figure 1. Wine quality in California Cabernet Sauvignons (blue line) and the Southern Oscillation Index (red line), revealing the significant and direct impact of climate on wine. (Wine quality data taken from a Lett's pocket calendar guide to wines.)

It is not so obvious, however, that the reverse is also plausibly true. That is, ***oenological forcing exerts a significant influence on scientific productivity in ocean-atmosphere research***. This is the hypothesis that we shall explore in this discussion. I have been fortunate in experiencing some first-hand effects of this dynamic process so I provide the representative data here.

The forcing datasets include (1) Italian wines, c. 1992-1994, (2) French versus California wines, c. 2000-present, (3) German wines, c. 2006, and (4) Ensembles of wines, 2005-present. The response datasets include (1) Forecasting Iceland-Faroe Frontal variability, (2) ROMS adjoint model and data assimilation platforms, (3) Climate-fisheries linkages, and (4) Regional coupled ocean-atmosphere dynamics.

My first data point was established during my years living and working in Lerici, Italy, where Italian wines imbibed at a charming wine bar (Fig. 2), as well as in countless other restaurants throughout Italy, instigated numerous close collaborations with my local (Alex Warn-Varnas, Pierre Poulain of SACLANTCEN) and remote (Allan Robinson, Hernan Arango, Pierre Lermusiaux, Wayne Leslie of Harvard) collaborators. This directly led to four peer-reviewed publications in well-respected journals.

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Figure 2. Examples of the Italian vintage that forced a productive collaboration on Iceland-Faroe frontal variability.

My second data point derives from a friendly challenge motivated by Hernan Arango (Rutgers) who claimed that an expensive St Julien Bordeaux was superior to a modestly priced California Zinfandel [favored by the author]. A blind wine taste testing challenge ensued [in which the Zin prevailed] that consequently resulted in a series of blind wine taste testing competitions (Fig. 3) for which vigorous and detailed tasting notes were painstakingly assembled and validated. The highly productive collaborations (which also included Andy Moore, Manu Di Lorenzo, Bruce Cornuelle and Julio Scheinbaum, among many others) precipitated (at least) four benchmark papers in ROMS data assimilations and its applications.

Figure 3. Examples of wine forcing at various locales during the highly productive time period of the development of ROMS adjoint model and data assimilation platforms.

My third data point comes from a workshop hosted in Berlin by Jurgen Alheit, whose vinicultural expertise and voluminous reserves of German Rieslings (Fig. 4) drove an intensive, albeit short-term, interaction between physical and biological oceanographers (especially Andy Bakun). The result was a splendid refereed synthesis article on climate forcing of marine ecosystems and fish populations that was recently published.

Figure 4. Examples of the forcing functions derived from German Rieslings during a scientifically productive workshop on climate forcing of marine ecosystems in Berlin.

My fourth and final data point is associated with an ensemble of wine forcings from bottles obtained from around the world. It elicited a lively and continuing collaboration on coupled ocean-atmosphere feedbacks between my former Ph.D. student Hyodae Seo (now at Wood Hole), Ragu Murtugudde (University of Maryland), Markus Jochum (NCAR) and yours truly. The scientific production currently totals six refereed publications in distinguished journals, and continues today in an effervescent mode.

As a test of our hypothesis, I have quantified the magnitude of the oenological forcing and established a productivity index for the scientific output that ensued from each of the forcings considered here. A simple linear model relating oenological intensity to scientific creativity can thereby be developed. The result (Fig. 6) is manifestly evident and ***our hypothesis is verified***!

Antoine Badan recognized this fundamental relationship and applied it throughout his scientific career. His consequent influence on the field of oceanography and on the collegial culture of wine-making in Baja California will always be remembered.

Figure 5. Examples of the wines contributing to the ensemble forcing of our research collaborations on regional coupled ocean-atmosphere interactions.

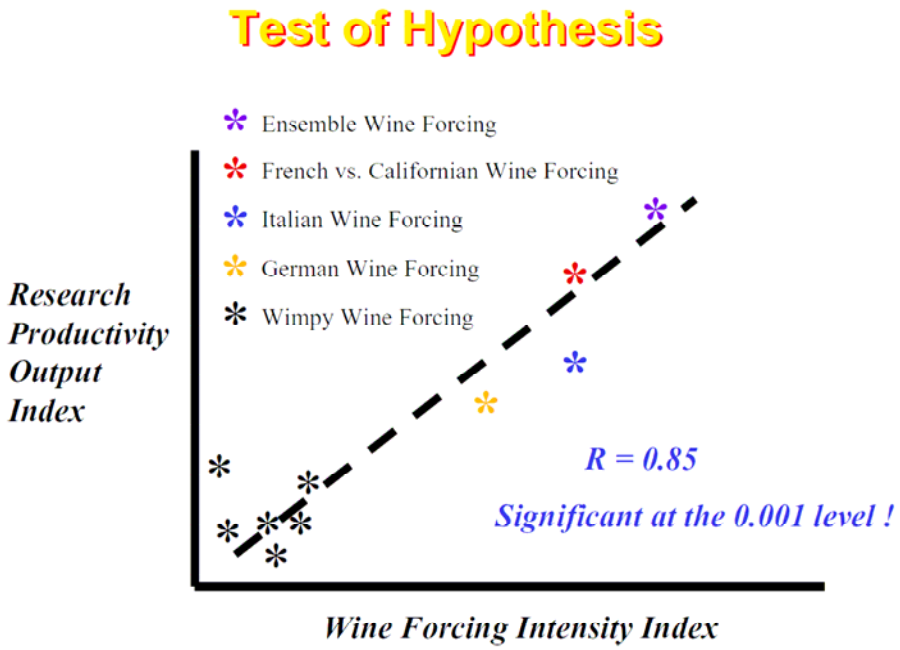

Figure 6. Wine Forcing Intensity Index versus Research Productivity Output Index for cases of both strong and weak forcing. The highly significant correlation validates the hypothesis.