

Historical memories of the GFD Program- the Middle Years 1971-2007

Jack Whitehead

The origin of the term “Geophysical Fluid Dynamics”

Shortly before he died, I asked George Veronis whether the program had coined the term Geophysical Fluid Dynamics. He said “no”, that the first use of Geophysical Fluid Dynamics (forever since then called GFD) known to him was at Johns Hopkins University, and he suggested I consult the archivist there. After receiving my request, the library archivist, James Stimpert, conducted a search for me and found that the list of course offerings in 1958-59 describes a full-term seminar organized by Professor George Benton and Associate Professor Robert Long with the title “Geophysical Fluid Dynamics”. A complementary course “Geophysical Fluid Mechanics” was offered simultaneously. No listings of the term GFD was found by the library search engine for previous years at John Hopkins University, so this might have been where the term originated. In any event, the term was used at WHOI for the summer lectures of 1959 and also for the Friday afternoon biweekly seminars with MIT. Since then the term has become widespread.

My first encounter with GFD.

This informal history is a first-hand narration of many of my experiences with the GFD program at Woods Hole Oceanographic Institution from the time of my arrival at WHOI in 1971 to the decade of my retirement from WHOI in 2007.

I became an Assistant Scientist at WHOI in September 1971 to conduct laboratory studies in fluid mechanics. Peter Saunders had used and maintained a laboratory that previously had been developed and used by a number of WHOI staff, including Allen Faller, Stuart Turner and Allen Ibbotson. Peter was becoming heavily involved in air-sea surface measurements and he welcomed me as a fellow laboratory practitioner. Immediately, the GFD biweekly Friday afternoon lectures helped me to develop communication with people throughout New England. (The seminars had expanded to Harvard, Brown, Yale and URI). The series was also extremely useful for establishing working relations between WHOI and MIT faculty during the next few years, which was the first decade of the joint program.

In the summer of 1972, Stuart Turner lectured in the GFD program and also conducted a series of simple experiments (as taught to him by G. I. Taylor, he explained!), so my first summer’s experience at GFD was off to a great start. (The photo of Turner and me below was not taken that first year but many years later when he revisited WHOI.)



Stewart Turner and me in the late 1000s

This history mostly contains my account of organizational aspects of the program. This side of the program is invisible to most visitors who can focus on the exciting and excellent scientific aspects of our craft. Clearly, without participation by legions of top level scientists, the program would fail. However, the GFD program could equally fail without the effort of those who have helped run things. This is in tribute to them all.

Evolution of GFD's Organization

There was no doubt that Willem Malkus and George Veronis ran the program for decades. George's history of the program, found on the GFD website, describes GFD's early years. I won't review his remarks except to quite bluntly add that Willem and George had different perspectives and styles (even though both were quick to quietly remind people of how the program should be properly run). Fortunately, although they were energetic at vocalizing their different opinions, occasionally strong ones, they were excellent at resolving them.



Willem was more “progressive” with numerous ideas about new topics and people and with clear hopes that the two great unsolved problems, turbulence and the dynamo might be addressed and conquered. He had fixed ideas about the scientific method that he expressed everywhere such as at social gatherings in the rooms, on the porch of Walsh, and during seminars. Willem was quick to invite new people to visit and speak and even asked many people to help organize things. The visitor, Robert Kraichnan, wrote a classic paper on turbulent convection. At the end of his paper Kraichnan’s citation states, “The author is indebted to Professor W. V. R. Malkus for many illuminating discussions (and a few confusing ones)”.

George was more traditional with a tendency to hold the program to a fixed set of topics in oceanography and stability studies that involved a smaller group of potential participants and helpers. He seemed to be happier with a smaller program involving a collection of people he had come to respect. He also was clearly more inclined to softly (but strongly, as only George could do it) insist on excellence in everything connected with GFD.

George explained in his history how the program had a steering committee to run things. This was chaired by Lou Howard. To my surprise, I was invited by Lou to be a member of the Steering Committee in 1976 where I gradually learned more of the inner workings of the program.

The well-established committee members were listed by George and they all contributed scientifically. Later, in 2008 I called them “the founders” (Veronis, Malkus, Stern, Howard, Keller and Spiegel). Peter Rhines likened the leaders to the Master and faculty of an old college or private school who would not let go of power. Ed Spiegel

urged new ideas for topics and visitors in astrophysics, but he did little actual organizing work except for involving people on the porch, which continued for many years (See photo below). Ed was simply wonderful to work with and talk to. His knowledge of the literature was phenomenal, and his enthusiasm and support of students and colleagues were exceptional. Joe Keller and Lou Howard brought in new applied mathematical perspectives. Hank Stommel was no longer involved in GFD and was busily organizing large physical oceanographic programs. Melvin Stern was always an active presence with seminars and numerous questions and was an excellent supervisor of fellows.

George's history does not list a number of other members of the Steering Committee. They were of my generation but many of them (us) seemed to enthusiastically contribute for a number of years and then leave. Andy Ingersoll was very active and regarded as a leader by all, and he seemed to attend almost every year. I recall his rental of a wonderful home on Little Harbor one summer. The program activity reached a peak in the mid-1970s (in my eyes), but then Andy gradually spent more time with his duties, research and students at Caltech, (although he was formally listed as a member of the Steering Committee as late as 1990). Peter Rhines was also involved after he arrived at WHOI in 1974 and he helped the program with attendance and advice. I believe that he was on the Steering Committee immediately after he arrived, (before I was invited). I got the impression that he had different ideas about the GFD program than the original people and gradually his focus shifted to programs within WHOI after John Steele became director. He left WHOI in 1984 and established a summer program at the University of Washington.

Willem and George did the routine running of the program day by day. In committee discussions everyone talked about the scientific aspects of the program topics. Ed Spiegel enthusiastically suggested topics in convection and chaos theory with George and Melvin leaning toward ocean sciences and convection. Usually George was Principal investigator of the actual proposal for funding, but Willem clearly coordinated with him.

Occasionally, other Steering Committee members were involved in proposal preparation. Melvin was Principal Investigator (PI) of the grant in 1964, and Andy Ingersoll was PI for 1973-1977. The proposal paperwork was handled by associate Dean, Jake Pierson, of the Education Office at WHOI, who worked almost exclusively with Willem and George. All three had great relationships with Mary Thayer, who ran the office as described by George in his history.

In the external world the program had gathered the reputation of being run by a closed group of people. Many who attended and who tried to help the program felt the same way. One factor contributing to the founders' regular attendance was that they considered the program their intellectual and also their summer home. I suppose that at times numerous forces pulled each of them away, but the founders all continued. They were all in their mid- 50s and were at the peak of brilliant careers in a number of well-developed disciplines. In addition, they had many commitments. Their continued participation is a great tribute to them all.

In spite of their dedication, by the middle of the second decade, and clearly by the early 1980s, we all were frankly concerned that the Steering Committee composition continued to be dominated almost entirely by the original members. To me, it was a miracle that GFD continued in the absence of a steady turnover in the Steering Committee. The founders' presence clearly set the tone of the program and seminars. In contrast, we younger members thought that it would be useful to identify with one of the exploding observational fields, whether it be planetary sciences, physical oceanography, or earth science. We tried to increase that aspect to the "GFD syllabus". We occasionally introduced new topics and suggested modifications that sometimes helped and at other times made the founders uncomfortable. Andy Ingersoll set the standard for us one summer when his focus was directed for the rapidly changing field of Planetary Fluid Dynamics and was PI of the proposal in the late 1970s.

Peter Rhines introduced two-dimensional turbulence and made suggestions about altering the basic structure. In 1982, I coordinated a geological summer with Willem, with lectures by Herbert Huppert. It included the first (and last) geological field trip during a specially focused week on Geological Fluid Mechanics. Willem called it "arcane" geology. Later, Glenn Flierl conducted a summer in Biological Fluid Mechanics that some founders said was too remote from "our" interests.

To be fair, most fellows and many of the members of the Steering Committee did not criticize and even supported such new topics, but clearly, the founders provided immense stability and inertia.

I recall a meeting of the Steering Committee where the next 5-year cycle was to be planned, and George started by saying "let's quit". Most of us argued against that, and at the end George confessed he was relieved by our response and glad to see the program continue. None would have disputed that we all were uncertain about how it would happen. I offered my resignation in the early 1980s in an effort to get the Steering Committee to recruit new members. I was staggered (and greatly flattered) to have George himself come to my office and ask me to continue. I did so, and in conversation with Melvin Stern learned that my providing a supporting laboratory at WHOI was what they considered valuable (not necessarily my charming smile, my brilliant new body of GFD science under my wings, or even my "witty" jokes). I like to think that my heckles and gestures helped the committee change from talking about the problem of an aging steering committee to starting a dedicated effort to recruit a larger number of new members.

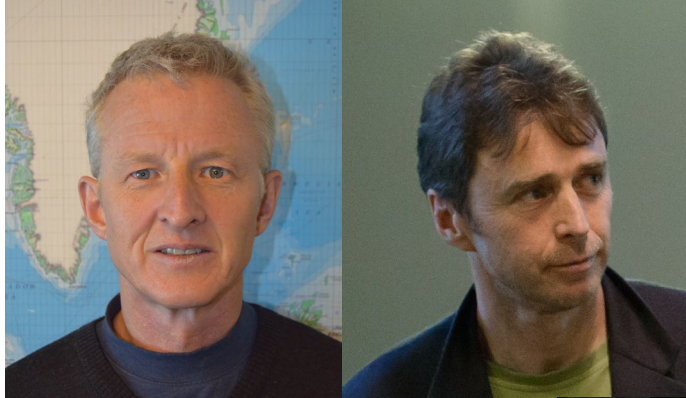
Fortunately, additional members gradually joined the Steering Committee. I hope I don't miss anyone when I list these additions during the 1980s and into the early 1990s: Glenn Flierl, Steve Meacham, Rick Salmon, Bill Young, Phil Morrison, and Neil Balmforth. They all have delivered excellent service to GFD and many have attended for one or more decades. Rick served as Director for a number of programs and credits himself for recruiting Phil Morrison. During that period Rick held many summers together with his work supervising fellows, serving as Director for a number of years, and co-authoring proposals for two 5-year cycles. Bill Young was PI of the proposal for a

five-year term, served as Director once, and delivered a superb set of principal lectures one summer. Neil began a newsletter, and all the others have all been Directors a number of years. In addition, Glenn and Steve guided us into the computer era. Some individual contributions are described in more detail below.



Neil, George and Phil

These people helped enormously during the transition years. (We didn't call them transition years back then, but it was closer to "survival for GFD years".) For funding, George Veronis continued to be PI through 1989. Next, Rick Salmon and Glenn Flierl were PIs for two five year cycles from 1989 to 1999. Next, I was PI, first with Bill Young for 5 years and then with Neil Balmforth (approximately 5 years after he had been a GFD fellow!) and Phil Morrison until 2009. Although this history is not intended to extend later than that, from 2009 to 2014 Karl Helfrich was PI along with Charlie Doering, Jean-Luc Thiffeault, and Claudia Cenedese. And finally, since 2014 Claudia Cenedese has been PI (see photos).



The Principal Investigators for the GFD program since 1989.

GFD survived by finding a strategy of how to evolve. In my opinion, the most brilliant contribution (tactical genius) came from the suggestion by Neil that we organize a faculty. The Faculty “outflanked” the Steering Committee and made obsolete the requirement that each member should come every year. Instead, prospective faculty members were asked to commit to only one full summer every 5 years. Membership in the Faculty was not necessarily permanent either. People could be members for a few years. Finally, the Faculty could number up to 25 members and this removed the image that GFD was run by a small “in” group. The concern that was voiced by the external community in the 1970s and 1980s completely vanished (to my eyes, by magic) and has not arisen again. I think that the Faculty has been successful because by the year 2000 enough people existed who knew how we operated so that the program structure and traditions have happily remained intact. (Earlier in the 1970s the collection of alumni was much smaller.) By the time the 50th anniversary rolled around, the Faculty had taken over.

Although the transitions were awkward, the program was still extremely healthy intellectually (the most important aspect). To give an image of how complex and awkward in appearance the transition of GFD leadership was, here is what NSF was told in the proposal submitted for 2004;

“Currently, the program is governed by an interdisciplinary steering committee which is composed mainly of scientists who have been affiliated with the Program for between ten and twenty years, and who were invited to join after participating in several summers on their own initiative. The founders of the program, whose commitment has been responsible for creating a strong and successful program without equal, have largely withdrawn from direct management of the program, though their advice, experience and scientific judgment are still valued. They form the Advisory Committee, whose counsel is solicited by the Steering Committee.

The current members (2004) of the Steering Committee, Advisory Committee and Faculty are listed below and consist of professors from several universities and fields. According to their respective home departments, the members include applied mathematicians, an astrophysicist, a geophysicist, some oceanographers and a physicist. However, the combined research interests of these scientists is broader still. The Steering Committee consists of:

- *Balmforth, Neil J., Dept. of Mathematics and Statistics, University of British Columbia*
- *Flierl, Glenn R., Department of Earth & Planetary Sciences, M.I.T.*
- *Morrison, Philip J., Physics Department, University of Texas at Austin*
- *Salmon, Richard L., Scripps Institution of Oceanography*
- *Whitehead, John A., Woods Hole Oceanographic Institution*
- *Young, William R., Scripps Institution of Oceanography*

The GFD Advisory Committee consists of:

- *Howard, Louis N., Department of Mathematics, Florida State University, and M.I.T.*
- *Keller, Joseph B., Dept. of Mathematics and Mechanical Engineering., Stanford Univ.*
- *Malkus, Willem V.R., Department of Mathematics, M.I.T.*
- *Stern, Melvin E., Department of Oceanography, Florida State University*
- *Spiegel, Edward A., Astronomy Department, Columbia University*
- *Veronis, George, Department of Geology and Geophysics, Yale University*

The GFD Faculty is made up of members of the scientific community, across several disciplines, united by their interest in GFD. These are faces to be seen regularly at GFD over the coming summers, and who run the Program. The Faculty serve as contact people and "ambassadors" of GFD. The research interests of the Faculty help to define the scientific direction and flavor of the Program. The current faculty is listed below, and this group of multidisciplinary experts will evolve continually.

- *Oliver Buhler, Courant Institute, New York University*
- *Claudia Cenedese, Woods Hole Oceanographic Institution*
- *Eric Chassignet, RSMAS/MPO, University of Miami*
- *Charles Doering, Department of Mathematics, University of Michigan*
- *Karl Helfrich, Woods Hole Oceanographic Institution*
- *Richard Kerswell, Department of Mathematics, University of Bristol*
- *Norman Lebovitz, Department of Mathematics, University of Chicago*
- *Michael Proctor, DAMTP, Cambridge University*
- *Antonello Provenzale, Istituto di Scienze dell'Atmosfera e del Clima, "CNR"*

One year later, in the 2004 Newsletter, this awkward evolution was nearing completion, since the members of the Steering Committee and Faculty were all merged in the list as faculty. Moreover, two others, John Wattlaufer and Jean-Luc Thiffeault, had been added. Formally, (is anything formal at GFD??) in the proposal in 2008, only the title "Faculty" was used for the list. Although the span of this history does not include what has transpired since 2009, I want to mention that since then, the GFD Faculty has had a small number leave the ranks in addition to all the deceased founders. The following people have joined the Faculty: Richard Kerswell, Joe Pedlosky, Stefan Llewellyn-Smith, Tiffany Shaw, Bruce Sutherland, Mary-Louise Timmermans, Pascale Garaud, Greg Chini and Colm-cille Caulfield. Many of these have already helped direct summer programs. In approximately 2014, the internal organization was discussed in more detail by the Faculty. Because the Faculty is a much larger group, an executive committee was created to oversee the business of the Faculty, including the proposal and interaction with the institution. Finally, some faculty members are emeritus, which means that we receive no travel support.

Other changes

At each seminar the GFD staff and visitors sit alongside the fellows and simply keep learning. I loved the GFD program along with its emphasis on new ideas and topics, and especially its atmosphere of creativity. During the summer, almost no thought was expended by all of us on the governance problems. However, there were other problems. I did hear people say about some studies, “Oh, that’s just a GFD problem”.

Over the span of the 60 plus years of GFD, science has changed enormously, and GFD has had to evolve from presenting a small collection of highly idealized models as was done in the 1960s, to considering a wide range of studies of fluid dynamics in the natural world. Techniques have changed, too. Numerical methods became much more effective and useful as computer power increased. Instrumental methods in the laboratory were likewise progressing in unexpected ways. Data for the oceans, atmospheres, the sun and stars, inside the earth and within engineering, likewise exploded. Along with all this, the role of women continues to evolve culturally, so that in the past 60 years women have become a large percentage of our scientists. How did the program adapt and evolve and how did it defend progressive decisions against sentiments cautioning against change?

Computers

One of the greatest changes in science during the past 60 years was the improvement in the technology for computers. Peter Rhines voiced concerns during the 1970s. After he left, Steve Meacham and Glenn Flierl in particular, literally saved GFD from computer obsolescence in the years 1980 to 1990.

Rick Salmon wrote to me about the main GFD challenge in the 1980s. He said that the greatest changes were *“from computers. This was the era of transition. In the early years people came to GFD to do analytic work, and in the present day, GFD (presumably) supplies the wifi connection and people bring their own kit. In the 1980s and 1990s people came to Walsh expecting to have the same computing facilities that they enjoyed at home. We bought a number of Sun workstations, which, if they still exist at WHOI, are now being used as boat anchors. They required copious software installation (and reconditioning after each over-wintering), and this fell heavily on Glenn Flierl and Steve Meacham. I recall several times when the two of them worked all through the night preceding the first day of the program.”*

Unfortunately for GFD, Steve Meacham had to leave when he joined NSF, but since then, Glenn has been joined by others to keep the facilities for both computing and publishing at GFD up to the present level of expertise for decades. Glenn in particular, keeps tabs very effectively and deserves immense credit for this contribution for over 40 years. In the 1990s the need for a computer room led WHOI to install a trailer. Although

it was said to be temporary by the administration, the trailer remains to this day. It presently contains a PC and a library with scattered volumes we all use.



Participation of Women

Another factor is the cultural shift throughout the world over the past 60 years in the role of women. In the years leading up to 1979, the program had an occasional woman fellow or visitor. The Steering Committee was concerned about this issue, and for a long period few applicants for fellows were not coming. Gradually, participation of women increased, but it was slow. By the mid-1990s there were two or more women fellows each year and the percentage finally reached 50% by 1997. (See the list of GFD fellows in the archives of the GFD website). The composition of the leadership from male-only status changed more slowly. In 2004 the Faculty included only Claudia Cenedese but now (July 2020), Pascale Garaud, Tiffany Shaw and Mary-Louise Timmermans were added to the list. In 2017 Claudia and Mary-Louise directed the summer program with the theme of Ice-Ocean Interaction.

Evolution of GFD Topics

George Veronis' description of science in the years 1955-1960 emphasized how the GFD program began in response to the need for more development and education about rotating fluids in oceans and atmospheres. After the program began, the range of topics expanded to astrophysics, turbulence, cellular convection, and the dynamo problem, and to some extent, that expansion continues to this day. I show 3 photos illustrating some topics: Left, Charlie Doering talking about bounding methods (These methods were initiated by Lou Howard at Walsh circa 1962-1963); Middle, Stephan Fauve lecturing on dynamo experiments (very much discussed by Willem Malkus in the

1960-1980s); and Right, an early laboratory demonstration of trans-critical flow (a topic of interest to Melvin Stern, me and others since the early 1970s).



Other topics include a wide range of geological and geophysical problems, stars, planetary dynamics, ice, biological swimming, ecology, and climate issues.

Through the years

The Laboratory

My life's work has mostly been to conduct laboratory experiments. They have the wonderful virtue of allowing a tangible result delivered to an inquiring mind without using logic or mathematics, (although both are useful for design and interpretation). Variables can be altered, (unlike the ocean or atmosphere) and one can often see the flows in three dimensions and in real time. People can gather around it and help improve it as well, so that unites students and staff in a common quest (like softball, as mentioned below).

At WHOI in the 1950s and 60s, many people, including Allen Faller, Stuart Turner, Allen Ibbotson, and Peter Saunders had conducted fundamental experiments in the WHOI laboratory in Smith building that contained both 1m and 2m diameter turntables. Willem Malkus constructed an additional laboratory in the basement of Walsh complete with turntable and assorted equipment (below) for easy use by the participants. My feeling after my arrival in 1971 was that all of the laboratories connected to me were freely available to participants at GFD. This included help by laboratory assistant Bob Frazel, who constructed most of the memorable devices for 35 years.



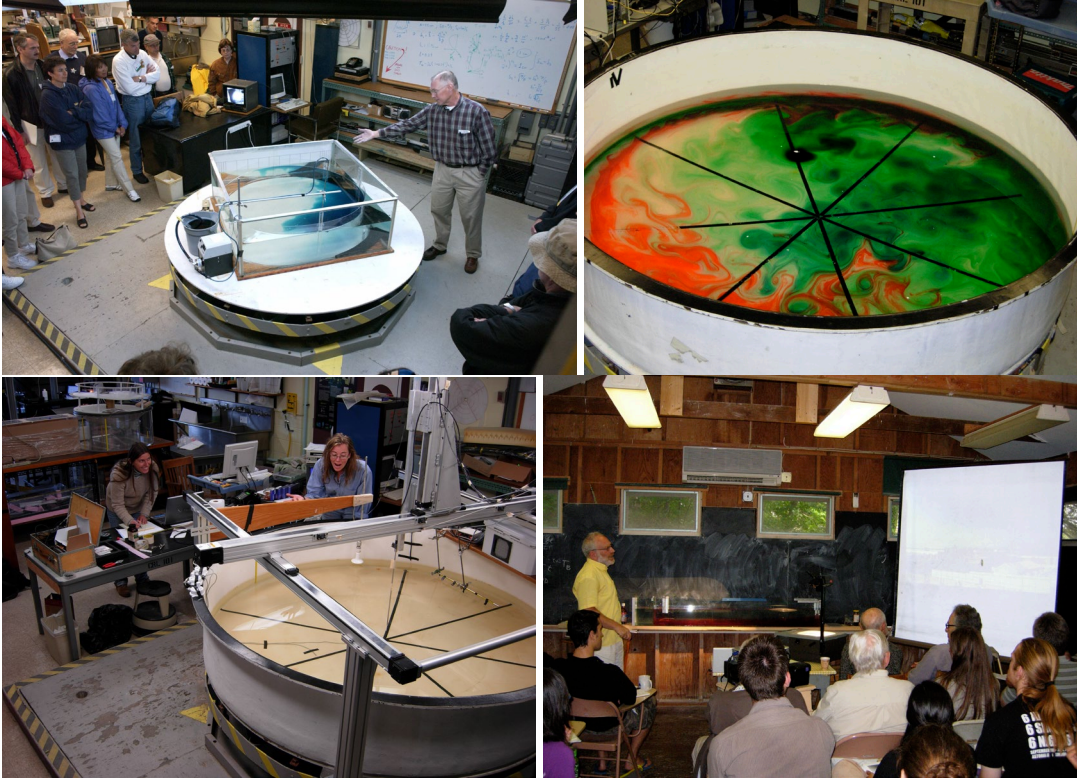
Hank Stommel and Lou Howard on the turntable in Walsh Cottage basement



My demonstration of the rotating hydraulics experiment to two visitors from the Soviet Union. This turntable in Smith Building was available to anyone needing it when it was not used in a major project.

In the late 1970s, the GFD Smith laboratory equipment was moved to new laboratory rooms on Quissett campus, and although we worried about the decrease in accessibility for GFD, it proved to be easy for visitors and fellows to travel back and forth and conduct experiments. Availability of a dedicated technician was vital. Overall, there was little decrease in use of the facilities. After Bob retired, laboratory help through the years also came from John Salzig, Keith Bradley and Anders Jensen. Although the Walsh basement laboratory finally began to collapse from extreme moisture and mildew, in the early 21st century, the Quissett GFD labs are still available to people at GFD. The total number of experiments conducted there is well over 100.

When Karl Helfrich and later Claudia Cenedese joined the WHOI staff, their laboratory interests led to their involvement with the laboratory, and ultimately to their contributing to the GFD program as Faculty. They assumed control of the laboratory when I retired, and continue to provide this facility to the GFD people as needed.



Upper left. A demonstration to Caltech alumni. Upper right A table full of eddies. Lower left. An experiment in progress by Claudia and Anna Wahlin. Lower right. A laboratory demonstration during a seminar by Herbert Huppert.

WHOI staff participation

This brings me to describing the role of the WHOI staff member. Historically, many of the original participants had left their staff positions at WHOI by the mid 1960s. Although at first George and Willem knew by first name who to ask at WHOI when GFD needed help with something, as time went on, they knew fewer people. In fact, I have often wondered whether a factor concerning my invitation onto the Steering Committee might have been to help as a WHOI liaison. Of course, after I arrived at WHOI and into the mid 1980s, I was very happy to help from time to time. For example, when Jake Pierson had a question about the proposal or when there was a question in the off season about the cottage maintenance, I was there to answer questions.

After Jake retired from the Education Office as Assistant Dean, I became even more active in helping the proposal process during the off season. In addition, after Mary Thayer retired, she was replaced by office helpers hired by the education office. Florence

Miller stepped in, but then she too retired, and there was a string of years when support staff in the Education Office regarded the assignment to Walsh as an assignment, as Rick Salmon said “tantamount to Siberia”.

Sometime during this period, the WHOI Dean, John Farrington, made important organizational changes. Future proposals were to go out of the Physical Oceanography Department instead of the Education Office, and the Staff Assistant also had a post in the PO Department rather than education. However, the process of selection of the fellows and the channels of their support and travel continued to be conducted through Education. (I was, of course a PO staff member, so that even when my name was not on the GFD proposal, I guided the paperwork internally until it went out to NSF and ONR.)

Another important organizational change was that the Education Office offered to provide me with some support for the hours that I spent on GFD, along with the title “Faculty Liaison”. The staff assistant was supervised by me and that supervision continues to be done by a member of the PO department for preparing the proposal and annual reports. The reorganization resulted in a much more streamlined process than working with an administrator in a distant office and is a good example of how good administration can help such a program. Janet Fields arrived in 1999, and she has provided wonderful support from the Education Office since then. She serves both at Walsh during the summer to register fellows and in the Education Office in the off season to handle all the details of the admission process.

For day-to-day staff support, our Physical Oceanography staff assistants are the ones who sit in the Walsh office and log in the countless visitors from everywhere. The people doing this have changed through the years. Penny Chisolm happily offered to make the coffee and also brought snacks and put flowers on the porch (traditions that the staff continues to this day but was once objected to by a staff member). The same excellent help has been given by Jeanne Fleming and Julie Hildebrandt. Shirley Cabral McDonald helped with proposal preparation when Julie was new. Karl Helfrich, who supervised a number of proposals and budgets, very unselfishly declined the offer to become Faculty Liaison and suggested that it be awarded to Claudia. This continues to the present.

Funding

Returning to the 1980s, the funding level had dropped to the point where only 8 fellows were admitted for a few years. Later, to cut expenses, some of the founders declined any further travel support to GFD. Although travel by younger members was adequately supported, any idea that summer homes could be supported with the travel money, as had been a source of past criticism, was gone. There were a number of awkward years of transition as the new people who had been recruited early in the 1980s and 1990s took over. Although they received very little travel support, things gradually improved. To ease the financial stress on the program, the Office of Naval Research (ONR) supported one year alone in the early 1980s. Also, ONR expressed interest in supporting the GFD laboratory work at WHOI. Melvin Stern and I took advantage of that

to write a joint proposal that funded his participation at Walsh during both the summer (and off-season) and provided for my own research, as well. That enabled him to use summer travel money to work with me and to participate in the program. The money also supported laboratory supplies, the use of the WHOI lab by GFD participants, and support for one month of time for our valued technician, Bob Frazel. These were assets that we, (mostly me), had previously supplied to the GFD program for free. Bob Frazel unselfishly hosted many fellows on weekends and prepared the bicycles on his own time. Finally, funding improved and by the early 1990s, ONR support was enlarged to a direct proposal to ONR in conjunction with a proposal to NSF. This ONR/NSF support continued for many years. After that, the program was successful enough so that funds from NSF alone were sufficient, (although possibly there were funds shared internally between ONR and NSF). Finally, ONR supported a special symposium in honor of Lou Howard on Friday, July 17, 2009. Talks were presented by Oliver Buhler, Nancy Kopel, Jie Yu, and Charlie Doering. Since we were limited in the number of speakers, it included the first and only GFD poster session

Walsh Cottage



Sketch by Jun Zhang

During the first 40 years, Walsh Cottage as a building was not always viewed as an asset to those at WHOI. In fact, once I was told that the Education section of WHOI experienced pressure from other branches of the administration because education should not have space. One year I was suddenly told of an internal WHOI decision to move the program to another location. The decision was made without consulting any of us. Although nothing was done that winter, at the beginning of the following summer a grotesque handicapped ramp was constructed on the front of the porch, again with no correspondence with us. After our protests, the ramp was relocated to the side door where it was clearly less ugly and more suitable. These two incidents made it clear to us that we had to more effectively organize ourselves so that our value to WHOI and our needs were made clear to WHOI. We met and discussed all options, even whether we wanted to consider a move to a better building on the Quissett Campus. We ultimately rejected any move and chose to remain in Walsh, not only for its intimate atmosphere, but because it did not get diluted with other people and groups in nearby proximity who could distract us. The desire to stay at Walsh was clearly conveyed to WHOI and in retrospect it was very wise. Shortly thereafter, Glenn, Rick and Jake Pierson wrote a proposal to NSF for Walsh renovation with better bathrooms and handicapped access. It included

winterization for meeting use during the winter. The proposal was declined. NSF explained they did not fund building renovations from that fund (the fund was for scientific facilities). And finally, a trailer appeared next to Walsh to help with computer needs, and it has remained there ever since. Since then, the image of GFD as a self-governing program within WHOI has been accepted throughout WHOI. Walsh cottage has been modified with adequate wiring for all the computer needs, air conditioning was added to the lecture room, further dehumidification was put in the basement, and cooling installed in additional rooms.



International connections and minorities.

There were extensive connections at the beginning of the program with people from Europe and concurrent fellowship applications from that region. Fellow applications with other parts of the world grew more slowly. I recall Ryuji Kimura arriving. He was the second student from Japan and arrived with a complete laboratory project ready to start in his mind. He energetically gathered equipment in the Walsh Basement the first Monday afternoon. One weekend, he presented a sketch of Walsh Cottage to the office as a gift and it still hangs on the wall in Walsh and continues to adorn T-shirts. He was sent a gift of the shirt in 2018 and returned a photo of him wearing it for display in Walsh (see the section on T-shirts). A sequence of fellows from Japan followed for a number of years.

In 1983, Andrey Zatsepin, now at the Shirshov Inst. of Oceanology, Russia, and Sergey Voropaev, now at Florida State University, were permitted by the Soviet Union to attend. In that Cold-War era, they were required by Russia to remain in the village of Woods Hole, and I think that they had to report to security weekly. Bob Frazel spirited them off to his house for some weekend visits, and he told me that once to his horror they wandered off-Cape! Finally, Ed Spiegel traveled frequently to France and Italy and fellowship applicants grew from there. At present, there are numerous applications from around the globe. The program has not been so fortunate at attracting applications from qualified minorities.

Newsletter

The first newsletter, composed by Neil Balmforth and Jean-Luc Thiffeault in 2002, was a great success and it continues to the present. The first edition https://gfd.who.edu/wp-content/uploads/sites/18/2018/03/gfdnews2002_16876_114824.pdf symbolized the emergence of the new generation who pitched in to help the program evolve. It is a wonderful read throughout. It contains a description of the lectures and events, the announcement of creation of the new Faculty, fund raising for a lectureship, and advertisement of the GFD website.

Softball

This tradition continues unchanged for the entire 60 years. The account of the activity in the first GFD newsletter is a gem. The team always required the participation of at least one of the staff, and after Willem became less active, the organization of the softball team was run for many years exclusively by George, and then responsibilities were taken up by Rick, Phil Morrison, (who played softball back in Texas and was solid third base) and Charlie Doering. Here is a photo of George and Joe Keller both well into their late 80s participating. The next photo shows the final game not long ago with certain bodies obscuring the score. I believe the fellows came from behind to beat the staff in that one, but there is obviously little direct evidence of that.





Promotional activities

We had celebrations to celebrate 30, 40 and 50 years of GFD. For the 30th year a picnic was held in 1988 with a cake and presentation of certificates to George and Willem from John Steele, WHOI Director.



This grainy photograph was taken in the informal spirit of GFD with trash barrels and libations cluttering the foreground.

The 40th birthday of the Program, in 2009 was celebrated with a picnic under a tent provided by WHOI on the Quissett ballfield. George Veronis gave the first of his three historical talks of the program. The talks led to his history published on the GFD website.

The 50th year of GFD was 2008. The founders were honored that summer in an event with a tent, food and drink on June 27 on the lawn behind Challenger house. We were able to gather them together for a formal (left)/informal (right) photo sitting. Melvin Stern had not been back recently because of health challenges, and he was so excited he could not stop talking.



Founding members of the Steering Committee of the Geophysical Fluid Dynamics Program. Front row (left to right), Louis Howard, Melvin Stern, Willem V.R. Malkus, Rear row, Joseph Keller, George Veronis and Edward Spiegel. One founding member, H. Stommel is deceased. (Photo taken by T. Kleindinst on June 27, 2008.)

The Founders

Education Award by AGU

Later that winter, the founders (above) were honored by the AGU Excellence in Geophysical Education Award.



The award .

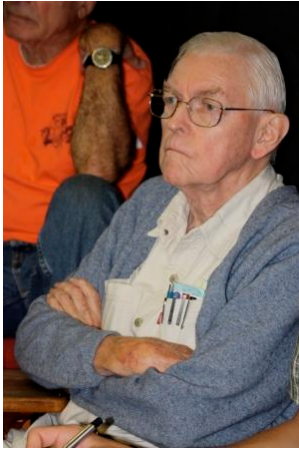
Although I had dreamed that all the founders could attend the AGU award ceremony, various health problems and commitments occurred to the extent that only George Veronis attended the AGU banquet and accepted on behalf of the group. My citation for the award and his acceptance address, which is a historical outline of the program can be found at <https://honors.agu.org/winners/geophysical-fluid-dynamics-program/>. His written address constituted the second delivery of George's informal history of the program that subsequently was written up by him and remains on the GFD website at <https://gfd.whoi.edu/archive/program-history/>. I noted that the old mental inertia remained in his address because he accepted the award on behalf of the Steering Committee rather than the founders, as though they were the same group.



Left John Farrington, WHOI Vice President and Dean was present to congratulate George. Right, Carol Finn, AGU Secretary-treasurer and President-elect for the term 2013-2014 joined the table with George while I proudly stood behind.

There have been a large number of specialized symposia organized in mid summers throughout the history of the program. These events have never been enumerated and must simply be located in the different list of the programs.

In 2008 a novel request was made by some people outside the GFD. They asked me if I would like to organize a symposium in honor of Lou Howard at GFD. I gladly consented, and the Office of Naval Research funded the event. Lou had become involved in a number of activities in addition to GFD that were not closely covered at Walsh such as nonlinear chemical reactions and chaotic electric circuits so that the talks included an unusually wide range of topics and visitors (below). Of course, those studying upper bounding techniques were happy to honor the originator of that topic as well.



Lou Howard listening at a lecture and attendees at the Howard Symposium.

APS reception

In 2003 the GFD program instituted a reception on Monday night during the Annual meeting of the Division of Fluid Dynamics of the American Physical Society. This meeting occurs each year starting on the weekend before Thanksgiving. I believe Claudia, Phil and I initiated an APS/GFD reception, but since then it has been run almost exclusively by Claudia Cenedese. Attendance has been excellent it is a wonderful way to joyfully reconnect with past participants, guests and former fellows.

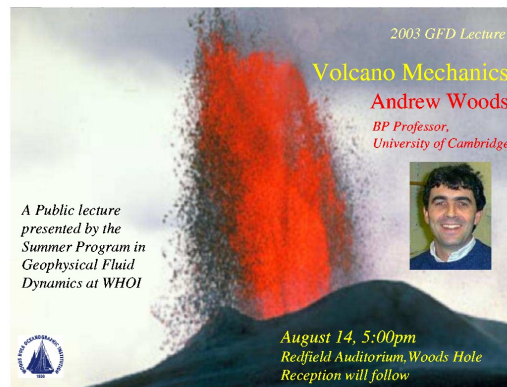
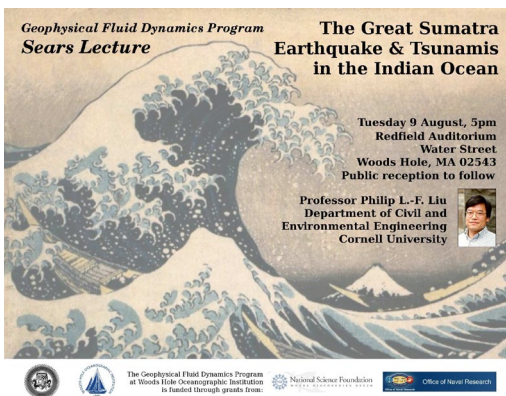




Ed Spiegel is in the upper left at the first reception in New Jersey in 2003 and the others are random shots of the APS receptions through the years.

Donations and the Sears Public Lecture

George Veronis solicited interest in the GFD program from Mr. Henry Sears, who initiated a sequence of annual donations that George supervised. For an interval of time, the donations accrued in time to build up the principal. Now, the interest supports the Sears Public Lecture each year.



Two Public Lecture announcements.

Others have also made significant donations as well. A fund donated by Neil Balmforth supports one fellow each summer, and George made a large donation a few years ago for support of the program.



Amanda Stern donated a beautiful teak bench in honor of her father Melvin. Its use is attested by George and Joe who are happily surrounded by a number of participants.

Life at GFD

Only photos.



Photographer herding butterflies.



Ed Spiegel discussing some calculations with Antonello Provenzale.



Even during the coffee/tea break, intense activity extends around all 360 degrees of the lecture hall and spills over to the “lounge”. The chalkboard has enough ideas for the next hundred years.



Tireless Andy Woods reviews his morning's talk at lunchtime after two hours of lecture. The fellows are mesmerized.



Two more views of the typical porch

(Almost) trivia ---T-Shirt

I made the first T-shirt in, I believe, 1979. I had previously mentioned a desire for a shirt once or twice to people in the Steering Committee, and finally I went ahead on my own and designed one, took orders and delivered them. It has a WHOI logo over the heart in front and a large GFD seal on the back. After it was worn, Willem telephoned me on a Friday evening and criticized my design (bad symmetry, the blazing color is garish and hard on the eyes, and so on). After considerable discussion, I finally invited him to produce another design and he did. His design has a portion of the GFD seal over the heart and the sketch of Walsh on the back. For the next couple of decades, I took orders

for all of them from Howlingbird Studios and delivered them to everyone. The colors were fixed. Mine had a yellow background with yellow blue lines (shown below), and the second design had light and dark shades of tan. Next year, my design reversed the yellow and blue, with the tradition of annually alternating background and line colors for many years. Willem's design kept the same two colors. Eventually, in the early 1990s some fellows and staff wanted different colors. I avoided the issue (was this my beginning of "old boy" status??), because we would have lost the bulk discount. Finally, different colors were ordered independently. (I knew that this was happening and was delighted to see youth flex their muscles.) The fellows seemed to be uncomfortable near me and they wore the new colors only at softball (as far as I was aware). The colorful shirts only emerged in Walsh on the final day of the program. Later, Claudia took over ordering the T-shirts, and now I believe it is done by the staff.



Summary

This account of the program and its people is naturally clouded by my own experiences, but this is the only way for me to be sure of events. In my view, the most important aspect is all the talks by experts that have remained at the same excellent quality. The talks are a bit shorter with one hour in the morning replacing the two-hour marathons of the first thirty years or so. Clearly many more people know how the whole enterprise runs now.

The program is popular, but a larger number of participants each summer presents challenges to the close relations between fellow and staff. There is an evening where staff members suggest possible topics of research, but that cannot replace a seminar by each staff member presented during the two weeks following the Principal Lectures that used to be the norm for Staff members. I hope that each summer's staff stays small enough for fellows to know the work of each staff participant. Only in this way can students and staff get to know each other's work and sit next to each other with the equal goal of good original research.

Glenn Flierl was a fellow in 1972, so he has as great an exposure to the program as I do. He has served in many capacities on the Steering Committee and Faculty and possibly he might like to give his own experiences someday. Joe Pedlosky attends regularly and serves on the Faculty. He is presently the person with the longest span of participation since he was a Fellow twice in the early 1960s, and his perspective might also be interesting to learn.

The program moves on. Three of the founders were having a chat when I took this photo.



One of their replacements, Claudia, is chasing her child and another child was having fun.

To all of the GFD lecturers I have heard up until now (probably 1000+), I want to end with this:

“Many of you will not (and some cannot) read this. Nevertheless, I have great gratitude to all of YOU for all I have received.-----Thank you all!”