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isiZulu

UKUQAPHA NGESO LOKHOZI ULWANDLE JIKELELE NGAMAROBHOTHI E-ARGO

Blair J. Greenan[1*], Annie P. Wong[2], Tammy Morris[3], Emily A. Smith[4] and Marine Bollard[5]

[1]Bedford Institute of Oceanography, Fisheries and Oceans Canada, Halifax, NS, Canada
[2]School of Oceanography, University of Washington, Seattle, WA, United States
[3]South African Weather Service, Cape Town, South Africa
[4]National Oceanic and Atmospheric Administration (NOAA), Washington, DC, United States
[5]Euro-Argo European Research Infrastructure Consortium (ERIC), Brest, France

Uke uzibuze ukuthi ososayensi bazi kanjani ngokwenzeka ekujuleni kolwandle? Kunezinhlobonhlobo zamarobhothi akwazi ukutshuza aze afike ekujuleni kolwandle abuye esequkethe imininingwano enzulu ngokwenzeka olwandle. Kunohlobo lwerobhothi olubizwa nge Argo float, loluhlobo luyaye luhambe luye ekujuleni kolwandle luhanjiswa imisinga yolwandle (ocean currents) ebese libuyela ngaphezulu kolwandle emumva kwezinsuku eziyishumi (10) ukwazisa ososayensi ngolwazi eliqukethwe yilo.Njengamanje abalelwa esibalweni esingangezinkulungwane ezine (4000) amarobhothi e-Argo aqaphe ulwandle ukuthola ngokwenzeka kulo nsuku zonke. Lamarobhothi acosha imininingwane emayelana nesilinganiso sokushisa kwamanzi/izinga lokushisa kwamanzi, usawoti oqukethwe amanzi olwandle, kanti amanye akwazi ukuthola imininingwano emayelana namakhemikhali kanye nemingcele yezinto eziphilayo. Amarobhoti e-Argo awusizo olukhulu kwizazi zolwandle ekutheni zazi ukuthi ulwandle lusebenza kanjani,umthelela elinawo hhayi kwizilwanyana zasolwandle kuphela kepha emhlabeni jikelele.

KUNGANI OSOSAYENSI BEHLEZI BEQAPHE ULWANDLE NGESO LOKHOZI?

Ulwandle lubaluleke kakhulu empilweni yomuntu ngoba lusinika ukudla, imithi, ezokuthutha/ezokohamba kanye nezokungcebeleka. Ulwandle luyikhaya kwizilwanyana/kwizinhlobo ezahlukene zezilwane ezenza umhlaba ubukeke ungcono futhi umuhle kubantu. Isibonelo, **iplankton** encane olwandle ikhiqiza amanani abalelwa kumashumi amahlanu amaphesenti (50%) womoya esiwuphefumulayo. Ulwandle lwakha amaphesenti angaphezu kwamashumi ayisikhombisa (70%) endawo yomhlaba liphinde lidlale indima esemqoka kwezemvelo emhlabeni jikelele.

IPLANKTON
Umanyolo okhukhulekayo usuka emasimini uze ufike olwandle ukhulisa ulwelwe olubuhlaza oluntanta emanzini (the phytoplankton), lolulwelwe luyakwazi ukuzakhela ukudla lwalo lusebenzisa ilanga (phecelezi i-phothosynthesis). Kanti kunamagciwane adla lona lolulwelwe nawo antanta emanzini (zoo-plankton). Zombili lezinhlobo(ulwelwe namagciwane) zibizwa ngeplankton.

ISIMO SEZULU
Amazinga emvula, noma okushisa noma okuvunguza komoya kanye nokuthi umoya ulibhekise ngakumaphi amagumbi omhlaba.

IZINHLOBO ZOMOYA (GASES) EZIBAMBA UKUSHIZA EMKHATHINI
Amagesi abamba ukushisa emkhathini okubalwa kuwo i-carbon dioxide, i-methane, i-nitrious oxide kanye namagesi a-fluorinated.

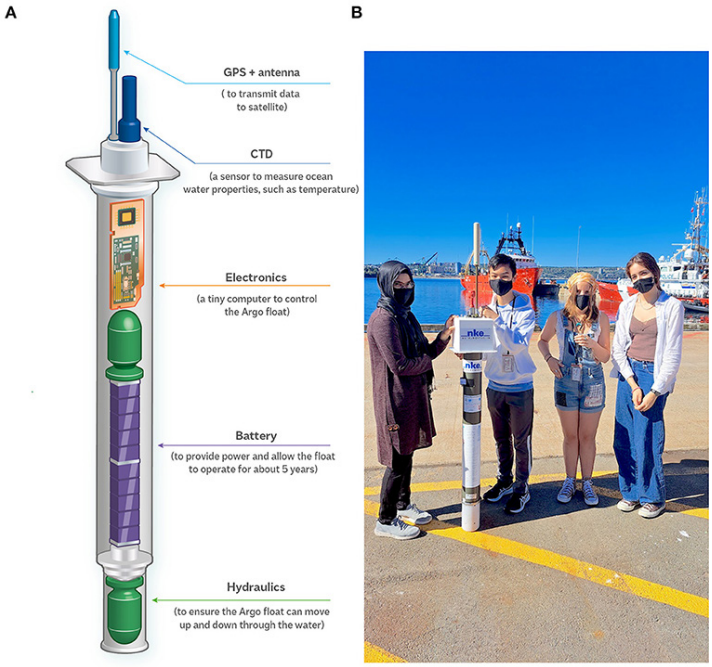
Ngakhoke ngenxa yalezizathu, ososayensi kudala bakubona ukubaluleka kokuqapha ulwandle ngeso lokhozi ukuze bezokwazi, baqondisise futhi bakwazi nokuqagela izinguquko ezingase zenzeke.

Ososayensi abafunda ngomkhathi bayakulangazelela ukuhlola ulwandle, bazi kabanzi ngalo, njengoba lunomthelela **kwisimo sezulu** esisithola nsuku zonke. Isibonelo, wake wabona amanzi ehwamuka emgwaqeni oshisayo? Kwenzeka okufanayo nasolwandle, lapho amazinga aphezulu okushisa olwandle edala ukuhwamuka kwamanzi olwandle.Ukuhwamuka kuthutha amanzi olwandle kuwase emkhathini, uma efika emkhathini ngohlobo lomuhwamuko afike akhe amafu, iqhwa kanye nemvula. Ngakhoke, ukuqapha izimo zasowandle kangcono kwenza isimo sezulu siqondakale kangcono.

Abanye ososayensi bangochwepheshe ekufundeni isimo sezulu somhlaba jikelele. Izifunda ezinesimo sezulu esishisayo zithola ukukhanya kwelanga okuningi onyakeni ngamunye. Lokho kwenza ulwandle lufudumale futhi kukhiqiza amafu kanye nemvula, ngakho isimo sezulu kulezizifunda kujwayeleke ukuba sishise futhi sibenomswakama. Kodwa isimo sezulu ngokuhamba kwesikathi siyashintsha. Isibonelo, ezinye izinto ezenziwa ngabantu njengokushayela izimoto noma ukushisisa amakhaya ethu kungaba nomthelela ekwandiseni inani **lwamagesi abamba ukushisa** emkhathini. Amagesi abamba ukushisa emkhathini asebenza okwengubo, abamba ukushisa aphinde afudumalise umhlaba. Ukucubungula nokuhlola ulwandle kusemqoka ukuze kwaziwe ukuthi abandakanyeka kanjani amagesi asemkhathini kwizinguquko zesimo sezulu, umthelela anawo kwisimo sezulu, njengoba ulwandle lukwazi ukumunca icarbon dioxide kanye nokushisa emkhathini womhlaba maqede ikuyise kweznye izizinda zolwandle ngokusebenzisa imisinga yolwandle.

AMAROBHOTHI E-ARGO: IZIHAMBI EZIKHULULEKILE OLWANDLE!

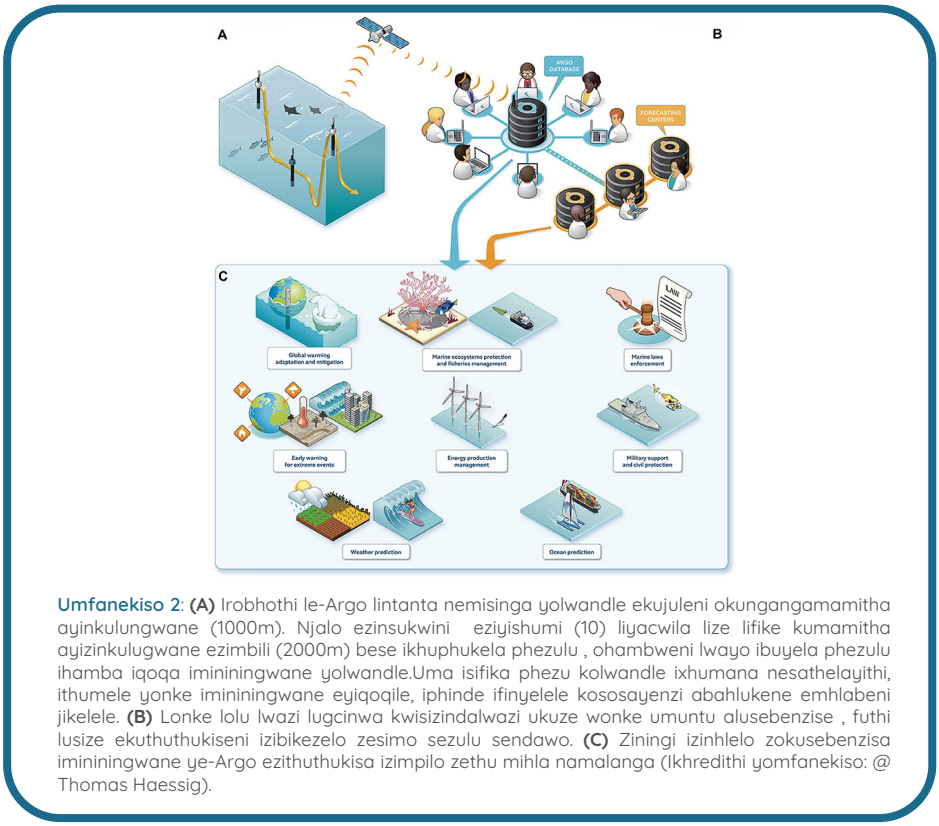
Ukufunda ngolwandle ososayensi kumele ngokungaphelimandla baqoqe ulwazi/ imininingwane yolwandle iminyaka ngeminyaka. Indlela esemqoka yokuqoqa lolulwazi ukuthi bagibele imikhumbi bayothatha izilinganiso zezinto adadinga ukuzicubungula (*Bheka kabanzi ngalokhu kwisihloko esithi- Frontiers for Young Minds*). Kodwa kunezindawo lapho imikhumbi ingakwazi ukufinyelela kuzo njenge Arctic ne Antarctic. Ebusika kuyaye kube nezimo lapho ulwandle lugubha amagagasi anodlame okwenza kubenzima ukuthi imikhumbi isebenze lapho. Ososayensi babe sebeqhamuka nesu lokwakha amarobhothi e-Argo azokwazi ukuthi aqoqe imininigwano/ulwazi kuzona zonke izinkathi zonyaka (*Umfanekiso 1*).



Umfanekiso 1: **(A)** Umdwebo okhombisa izingxenxe eziyinhloko kwirobhothi le -Argo (Ikhredithi yesithombe: @Thomas Haessig). **(B)** Iqembu labafundi besikole samabanga aphezulu nerobhothi le-Argo. Laba bafundi bebebambe iqhaza ekuthuthukiseni uhlelo olubizwa nge-Adopt-a-float eCanada.

IZINZWA
Idivayisi ethola futhi iphendule kokwenzeka endaweni.

Amarobhothi -Argo abizwa ngokuthi 'ayantanta'-okusho ukuntanta emanzini, aqukethe **izinzwa** ezenza kubelula ukuqoqa imininingwano yendawo/ulwandle akulona ngalesosikhathi. Yize ebizwa ngokuthi ayantanta, awantanti kuphela kodwa ashona phansi ekujuleni kolwandle aphinde anyukele phezu kolwandle (ehla enyuka olwandle). Ososayensi yibo abafaka amarobhothi e-Argo emanzini besebenzisa imikhumbi ukuwathwala. Uma esengenile olwandle ayacwila ekujuleni obulinganiselwe kumamitha ayinkulungwane (1000m), ebese ehamba ngokukhululeka esizwa imisinga yolwandle. Ahlala kulokukujula izinsuku eziyisishiyagalolunye (9), kuthi ngosuku lweshumi (10) iqhubekele ekujuleni obulinganiselwe kumamitha ayizinkulungwane ezimbili (2000m) iphinde ibuyele phezu kolwandle ihamba ithatha izilinganiso njengoba inyukela phezulu. Uma esefika phezulu kolwandle athumela yonke lemininingwano yolwandle eqoqiwe kanye nendawo abeqoqa kuyo ayithumele kososayensi ngamasathelayithi, lokhu kwenza kube lula kososayensi ukuqopha ulwazi ngaleyongxenye yolwandle bayigcine kwisizindalwazi. Ngemumva kokuthumela yonke imininingwano kumasathelayithi, lamarobhothi aphinde aye ekujuleni kolwande ayoqoqa ulwazi futhi (*Umfanekiso 2A*). Ososayensi basebenzisa izinhlelo zekhompuyutha ukuhlola izinga lezilinganiso nokuthumela yonke imininingwano kwisizindalwazi (*Umfanekiso 2B*). Izilinganiso zitholakala mahhala kuwo wonke umuntu phakathi kwamahora angamashumi amabili nane (24) amarobhothi ebuyele phezulu kolwandle (*Umfanekiso 2C*).



Umfanekiso 2: **(A)** Irobhothi le-Argo lintanta nemisinga yolwandle ekujuleni okungangamamitha ayinkulungwane (1000m). Njalo ezinsukwini eziyishumi (10) liyacwila lize lifike kumamitha ayizinkulugwane ezimbili (2000m) bese ikhuphukela phezulu , ohambweni lwayo ibuyela phezulu ihamba iqoqa imininingwane yolwandle.Uma isifika phezu kolwandle ixhumana nesathelayithi, ithumele yonke imininingwane eyiqoqile, iphinde ifinyelele kososayenzi abahlukene emhlabeni jikelele. **(B)** Lonke lolu lwazi lugcinwa kwisizindalwazi ukuze wonke umuntu alusebenzise , futhi lusize ekuthuthukiseni izibikezelo zesimo sezulu sendawo. **(C)** Ziningi izinhlelo zokusebenzisa imininingwane ye-Argo ezithuthukisa izimpilo zethu mihla namalanga (Ikhredithi yomfanekiso: @ Thomas Haessig).

USAWOTI
Isikalo sobungako bukasawoti olwandle/isilinganiso sokugcwala kukasawoti olwandle.

UKUMINYANA
Inani lento entweni (into enesisindo) uqhathanisa nokuthi ithatha isikhala esingakanani (umthamo wayo).

Amarobhothii e-Argo aqopha izilinganiso zengcindezi, izinga lokushisa kanye nezilinganiso zasawoti oqukethwe ulwandle kuleyondawo. Uma sikhuluma ngosawoti olwandle sikhuluma ngesilinganiso sokugcwala kukasawoti olwandle. **Usawoti** kanye nezinga lokushisa, kukokubili kunquma izinga lokuminyana kwamanzi olwandle. Ingcindezi yamanzi olwandle itshela ososayensi ukujula kwamanzi lapho izilinganiso zezinga lokushisa kanye nosawoti zithathwe khona. Olwandle, ukujula okungangemitha elilodwa kulingana nedecibar eyodwa (dba) kwingcindezi. Emkhathini ukuncipha nokwenyuka kwengcindezi kwenza izinhlelo zethu zesimo sezulu. Olwandle, **ukuminyana** kwamanzi kakhulu nokuminyana kwamanzi kancane kudala imisinga yolwandle, okuyiyo enyakazisa amanzi amaningi emhlabeni jikelele. Ukuqondisisa ukuthi amanzi ahamba kanjani olwandle, kubalulekile ukwenza ucwaningo ngesimo sezulu, kanjalo nokuvikela izitshalo kanye nezilwane ezihlala olwandle.

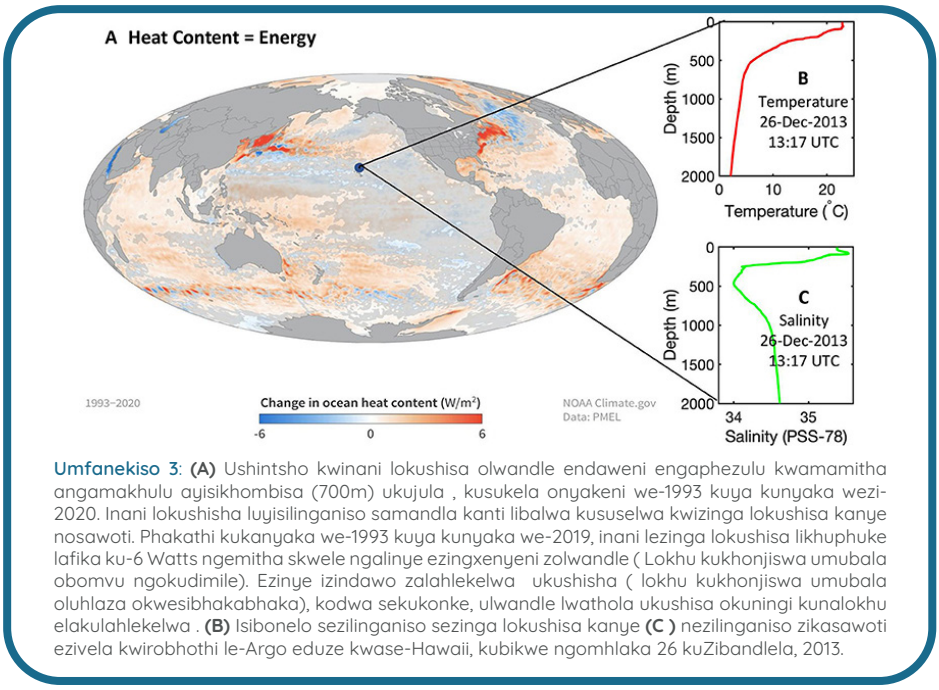
Ososayensi baqala ukuklama inethiwekhi yamarobhothi e-Argo ngasekupheleni konyaka wezi-1990, babefuna imininingwano igcwalise izilinganiso zobude bolwandle eyayiqoqwe isathelayithi ebizwa ngokuthi uJason. Ngokwezinganekwane zamaGreki, uJason wahamba ngomkhumbi obizwa ngokuthi i-Argo efuna uboya begolide. Ngakho-ke, ososayensi basolwandle babiza la marobhothi ngama robhothi e-Argo. Imininingwane yobude bendawo yolwandle evela Kuma isathelayithi ingahlanganiswa nemininingwane ye-Argo ukwazisa ososayensi ngezinguquko ezenzeka kwimisinga yolwandle. Amarobhothi e-Argo abelokhu ezulazula olwandle iminyaka engamamashumi amabili (20), aseqoqe izilinganiso ezingaphezu kwezigidi ezimbili (2 million) emhlabeni jikelele[1]. Namuhla kunamarobhothi e-Argo alinganiselwa kwizinkulungwane ezine (4 million) aqoqa izilinganiso zolwandle.

Amarobhothi E-Argo asebenzisa/anikwa amandla amabhethri futhi asebenza ubusuku nemini nsuku zonke zonyaka. Ngenxa yalamarobhothi, ososayensi sebekwazi ukuhlala beqaphe ulwandle lomhlaba kangcono kunaphambilini. Amabethri esetshenziswa kulamarobhothi e-Argo avamise ukuhlala isikhathi esingaphezu kweminyaka emihlanu. Uma lamabhethri esephelile, amarobhothi e-Argo awabe esesasebenza ayazika aye ekujuleni kolwande. Nakuba lokhu kungabukeka njengokungcolisa ulwandle noma ukulahla olwandle kodwa umonakalo kwimvelo muncane kakhulu uma uqhathaniswa nomonakalo odalwa ezinye izinto ezingcolisayo, futhi ulwazi oluqoqiwe lubaluleke kakhulu ekuqondeni Umhlaba.

KUNGABE AMAROBHOTHI E-ARGO ANGASITSHELANI NGOLWANDLE?

INANI LOKUSHISA OLWANDLE
Inani lamandla angesimo sokushisa agcinwe olwandle.

Kusukela ngonyaka we-1970, ulwandle seluthathe ukushisa okungaphezu kwamaphesenti angamashumi ayisishiyagalolunye (90%) okudalwe amagesi akhiqizwa izenzo/imisebenzi yabantu. Amazinga okushisa ezindaweni eziningi zolwandle anyukile. Enye indlela ososayensi abenza ngayo ukuqapha lokhu, ukusebenzisa izilinganiso zamazinga okushisa kanye nosawoti ukuze babale ukuthi kungakanani ukushisa okufakwe ongqimbeni lolwandle okubizwa ngokuthi **izinga lokushisa kolwandle** (*Umfanekiso 3*). Ngokusebenzisa imininingwane eqoqwe ngamarabhothi e-Argo, ososayensi bathole ukuthi izehlakalo ezifana nokushisa kwezulu isikhathi eside zenzeka kaningi olwandle, njengoba nje kwenzeka nasemkhathini. Lesi sikhathi sokushisa esinokushisa kwezulu isikhathi eside kudala izilwane zasolwandle ukuba zihambe ziye kwezinye izindawo lapho zizothola khona amanzi apholile. Nokho, izitshalo kanye nezilwane ezingakwazi ukuya kwezinye izindawo noma ezingakwazi ukunyakaza zisuke zizohlushwa yilokhu kushisa kwesimo sezulu esinokushisa isikhathi eside.



Umfanekiso 3: **(A)** Ushintsho kwinani lokushisa olwandle endaweni engaphezulu kwamamitha angamakhulu ayisikhombisa (700m) ukujula , kusukela onyakeni we-1993 kuya kunyaka wezi-2020. Inani lokushisha luyisilinganiso samandla kanti libalwa kususelwa kwizinga lokushisa kanye nosawoti. Phakathi kukanyaka we-1993 kuya kunyaka we-2019, inani lezinga lokushisa likhuphuke lafika ku-6 Watts ngemitha skwele ngalinye ezingxenyeni zolwandle (Lokhu kukhonjiswa umubala obomvu ngokudimile). Ezinye izindawo zalahlekelwa ukushisha (lokhu kukhonjiswa umubala oluhlaza okwesibhakabhaka), kodwa sekukonke, ulwandle lwathola ukushisa okuningi kunalokhu elakulahlekelwa . **(B)** Isibonelo sezilinganiso sezinga lokushisa kanye **(C)** nezilinganiso zikasawoti ezivela kwirobhothi le-Argo eduze kwase-Hawaii, kubikwe ngomhlaka 26 kuZibandlela, 2013.

Ukukhuphuka kwezinga lolwandle emhlabeni jikelele kuwumphumela omkhulu odalwa ukuguquka /ukushintsha kwesimo sezulu. Njengoba amanzi olwandle eya ngokufudumala, nawo ayanda, okungenye inhloko yezimbangela ezidala ukukhuphuka kwezinga lolwandle. Ukukhuphuka kwezinga lolwandle kunomthelela omubi kakhulu ezimpilweni zethu mihla namalanga/nsuku zonke njengoba kungunobangela wezikhukhula, ukuguguleka, futhi kuphinde kudale amanzi ahlanzekile angabe esaphuzeka ngenxa yokuxubana namanzi asolwandle anosawoti (*Bheka kabanzi lesi sihloko esithi Frontiers for Young Minds ukuze uthole ulwazi olengeziwe mayelana nokwenyuka kwezinga lolwandle*). Amarobhothi e-Argo ayithuluzi elibaluleke kakhulu ekuqapheni ukunyuka kwezinga lolwandle emhlabeni jikelele njengoba ehlezi eqaphe ngeso lokhozi kwizinguquko ezenzeka olwandle.

KHOMPYUTHA MODELI
Uhlelo olusebenza kwikhompyutha ukwakha uhlelo lwempela lomhlaba njengomkhathi womhlaba noma ulwandle.

Ukulandelela ulwandle sekuholele ekuthuthukisweni kwesimo sezulu. Ukusebenzisa imininingwane yamazinga okushisa kanye nekasawoti ethunyelwa amarobhothi e-Argo, ososayensi bengeze **imodeli yekhompyutha** yolwandle ekubaleni kwabo isimo sezulu. Ukuba nemininingwane yolwandle eyempela kulamamodeli kuthuthukisa indllela ososayensi abaqonda ngayo ukuxhumana komkhathi kanye nolwandle. Lokhu kusemqoka impela ekubikezeleni izimo zezulu ezizokwenzeka njengeziphepho, izivunguvungu, kanye nezishingishane ezithola amandla amaningi ezindawenu ezifudumele zolwandle.

SIYAJULA FUTHI SITHATHA INDLELA ENTSHA

Emandulo/esikhathini esedlule, amarobhothi e-Argo ayekalelekile ukuthi aya ekujuleni okungakanani olwandle, ayekalelwe ukujula okulinganiselwe kumamitha ayizinkulungwane ezimbili (2000m) lokho okusho umthamo wamanzi ongaphansi kwamaphesenti angamashumi amahlanu (50%). Kuyinselelo enkulu ukusongoza amarobhothi angaya ekujuleni kolwandle, kodwa akubavimbanga lokho ososayensi kanye nabonjiniyela njengoba besanda kusungula amarobhothi akwazi ukuya ekujuleni kolwandle okulinganiselwe kumamitha ayizinkulungwane eziyisithupha (6000m)[2]. Ukuthatha amasampula olwandle ukusuka phezulu kuye ekujuleni/phansi kuzokwenza ososayensi baqonde kangcono izinguquko ekushiseni nase nanini lamanzi ahlanzekile, futhi lokhu kuzohlinzeka ngolwazi olungcono mayelana kwenyuka kwezinga lolwandle emhlabeni jikelele.

Njengamanje sisekuqaleni kwenkathi entsha, lapho amarobhothi e-Argo engakwazi ukuthatha izilinganiso ezihlangene namakhemikhali olwandle/asolwandle kanye nezinto eziphila khona olwandle[3]. Lokhu kuzohlinzeka ngolwazi lwezinguquko kwinani lika moya-mpilo (oxygen) kanye ne carbon dioxide olwandle. Ulwandle jikelele lulahlekelwa umoya-mpilo (oxygen) futhi limunca icarbon dioxide eningi/eyedlulele emkhathini woMhlaba. Lezi zinguquko zinomthelela ongemuhle kwezemvelo yasolwandle okungabalwa kuzo izindawo zokudoba ezondla iningi lethu.

Amarobhothi e-Argo ayithuluzi lokuqala kwibhokisi lamatuluzi ezazi zolwandle. Ayingxenye yohlelo lomhlaba wonke olubizwa ngokuthi iGlobal Ocean Observing System (GOOS). Sisonke kanye nabanye ozakwethu beGoos, ukuthuthuka kwamarobhothi e-Argo kuzosisiza sakhe isithombe somhlaba wonke siveze impilo yolwandle kanye nokuthi lushintsha kanjani ngokuhamba kwesikhathi. Nawe ungaba yingxenye yezibukeli zolwandle. Kanjani na? Ngokwamukela ukuntanta. Ungakhetha irobhothi le-Argo, ulinikeze igama, uphinde ulandele uhambo lwalo lizungeza umhlaba. Ungaphinde ufunde kabanzi mayelana ne-Argo e-Argo Online School kanye nase Ocean Observers. Uhambo lwaso lwandle lukulindile.

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ITHUNYELWE: 13 kuNhlaba 2022
KWAMUKELWE: 21 kuMandulo 2023
ISHICILELWE KU-INTHANETHI: 06 kuMfumfu 2023
UMHLELI: Pedro Morais, Florida International University, United States
ABELULEKI BEZESAYENSI: Laura Lorenzoni and Sagi Dalyot

UKUNGQUBUZANA KWEZINTSHISEKELO: Ababhali bamemezela ukuthi ucwaningo lwenziwe ngaphandle kobudlelwane kwentengiselwano noma bezezimali obungahunyushwa njengokushayisana/ukungqubuzana kwezintshisekelo okungenzeka.

YOUNG REVIEWERS

DENIZ, IMINYAKA: 12
Sawubona, igama lami ngingu-Deniz, ngithanda ukubuka izinkanyezi ngiphinde ngidlale imidlalo yevidiyo nabangani bami. Iqoqo lezinkanyezi engilithandayo yi-Messier 45 kanti umlaza engiwuthandayo i-Orion. Umdlalo wevidiyo engiwuthandayo kakhulu i-Call of Duty 2.

LÉO, IMINYAKA: 12
U-Leo wazalelwa eFlorida futhi uthanda ulwandle; uthanda kakhulu i-snorkeling. Uyazifela ngomlando kanye nezinganekwane, ikakhulukazi uma kwezangaphansi kwamanzi. Udlala i-cello futhi unezinja ezimbili, futhi ukuthokozelela kakhulu ukudlala imidlalo yevidiyo ngesikathi sakhe sokuphumula.

OMER, IMINYAKA: 14
Nginentshisekelo enkulu kakhulu kwezombusazwe zamazwe jikelele, futhi ngithanda ukufunda ngezembusazwe, ifilosofi, kanye nemland. Ngithanda ukudlala imidlalo yevidiyo kwi-Nintendo switch kanye nekhompyutha yami, futhi ngithanda ukulalela ngiphinde ngidlale imidlalo yokulingisa njenge D&D kanye ne Warhammer 40K.

ABABHALI

BLAIR J. GREENAN
UBlair Greenan ungusosayensi wocwaningo esikhungweni semfundo ephakeme iBedford Institute of Oceanography ezinze eHalifax, eNova Scotia, Canada. Uphethe ezomnikelo waseCanada ohlelweni lwamazwe ngamazwe lwe-Argo. Ucwaningo lwakhe lugxile ekusizeni imiphakathi egudle ugu ukuba ikwazi ukumelana nokushintsha kwesimo sezulu solwandle. Lokhu kubandakanya ukukhuluma ngezinkinga/ngezindaba zezingqalasizinda ngokuthi ahlizenke ngamathuluzi asekelwe yisayensi nolwazi olumayelana nezinguquko zezinga lolwandle endaweni ngenxa yokushinthsa kwesimo sezulu.

ANNIE P. WONG
U-Annie ungusosayensi wocwaningo esikhungweni semfundo ephakeme iNyuvesi yase Washington eSeattle, WA, United States. Uyisazi solwandle esaqala kwisayensi yolwandle, eqoqa ulwazi/iminingwane yolwandle ngemikhumbi/emikhunjini. Njengamanje usesebenzisa imininingwane ayithola kumarobhothi eArgo ukufunda kabanzi ngo sawoti wolwandle futhi unentshisekelo yezilwandle ezizungeze i-Antartica. Uyingxenye yethimba le Argo Data Management elisiza ukusabalalisa imininingwane eqoqwe i-Argo emphakathini.

TAMMY MORRIS
UTammy Morris ungusosayensi oseqophelweni eliphezulu oPhikweni Lwezasolwandle lwe-South African Weather Service oluzinze eKapa, eNingizimu Africa. Uyisazi sasolwandle esibukayo/esiqaphelayo esesichithe izinyanga eziningi olwandle emikhunjini yocwaningo esebenza ngamathuluzi abuka ulwandle njenge-Argo floats, drifters kanye ne-mooring. Ucwaningo lwakhe lugxile ohlelweni olukhulu kakhulu lwe Algulhas Current, kanye nokusebenzisana okuningi ne Southern Ocean.

EMILY A. SMITH
U-Emily ungumphathi wezinhlelo ezahlukahlukene ekubalwa kuzo i-U.S Argo Program, iGlobal Sea Level Observing System, izindiza zasolwandle kwimingcele yemisinga, kanye nemikhiqizo equkethwe ukushisa kolwandle. U-Emily unomthwalo wemfanelo wokuphatha izabelomali kanye nokuhlela amasu ezinhlelo zokubuka. Uphinde aqondise uhlelo lwe-Adopt a Drifter, olusiza ebudlelwaneni nezikole zase-U.S. naphesheya, ukuze bakwazi ukulandelela ama-buoy akhukhulekayo futhi basebenzise lemininingwane emakilasini abo. Ngaphambi kokusebenza ka-NOAA, u-Emily wachitha isikhathi esiningi efundisa abafundi bamabanga aphakathi, loluhlelo lwamsiza ngoba ekugcineni wagcina esexhumana nomkhakha wezemfundo.

MARINE BOLLARD
UMarine unomthwalo wemfanelo abhekenenawo wezemisebenzi yokufinyelela kubantu ye-Euro-Argo European Reserach Infrastructure Consortium (ERIC). I-ERIC izibophezele ekuthuthukiseni umnikelo wesikhathi eside wase-Europe ohlelweni lokuqapha ulwandle lwe-Argo, ngenhloso yokulekelela ukwazi kangcono nokubikezela ngolwandle, iqhaza layo ohlelweni lwesimo sezulu kanye nempilo yolwandle. Uneziqu ezimbili zemaster's degree in hydrogeology engineering kanye nobuntatheli besayensi. Ngaphambi kokuza e-Euro Argo, uMarine wachitha iminyaka eminingi eshicilela izincwadi kanye nezindatshana ezidumisa/ezisabalalisa isayensi ngenjongo yokufunda kanye nokufundisa umphakathi.

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