

CURRICULUM VITAE ABREVIADO (CVA)**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.**Part A. PERSONAL INFORMATION**

First name	María		
Family name	Villa Alfageme		
Gender (*)	Female	Birth date (dd/mm/yyyy)	
ID number			
e-mail	mvilla@us.es	https://investigacion.us.es/sisius/sis_showpub.php?idpers=4783	
ORCID (*)		0000-0001-7157-8588	(*) Mandatory

A.1. Current position

Position	Full profesor – Catedrática Universidad		
Initial date	16/07/2022		
Institution	Universidad de Sevilla		
Department/Center	Dpto. Física Aplicada II		
Country	Spain	Teleph. number	954559763
Keywords	Radioactivity, biogeochemistry, ocean carbon cycle, biological pump, ocean circulation tracers, uranium, ²¹⁰ Po, ²¹⁰ Pb, ²³⁴ Th, ²³⁶ U, ¹²⁹ I, GEOTRACES, nuclear waste management, ionizing radiations		

A.2. Previous positions (research activity interruptions, indicate total months)

Position	Position/Institution/Country/Period
Técnico Superior Investigación - Radioisótopos	Universidad de Sevilla 2004 - 2008
Profesora asociada	Universidad Pablo de Olavide 2006 - 2008
Contrato Postdoctoral - MICINN	Univ Autónoma Barcelona 2008 -2009
Ayudante Dr.	Universidad de Sevilla 2009- 2011
Contratado Dr.	Universidad de Sevilla 2012 -2016
Prof. Titular Universidad	Universidad de Sevilla 2017

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Degree in Physic (Licenciado)	Universidad de Sevilla	1999
MSc in Physics Education (CAP)	Universidad de Sevilla	2001
PhD in Physics	Universidad de Sevilla	2004

Part B. CV SUMMARY (max. 5000 characters, including spaces)

Well-known international expert in radiochemistry, POC flux and gravitational biological pump quantification. I performed my PhD in Applied Nuclear Physics in the Universidad de Sevilla, developing low level counting techniques for radioactivity counting and development of radiochemical techniques. I fulfilled my postdoc in Institut de Ciencia y Tecnologia Ambientals, Universidad Autónoma de Barcelona (postdoctoral Fellowship MICINN-Fulbright) working in the use of radioactive pairs ²³⁴Th-²³⁸U y ²¹⁰Po-²¹⁰Pb to estimate ocean carbon export. I specialized in radiochemical methodologies, measurement techniques and application to the ocean. I was assistant professor at UPO, where in collaboration with Dr. F de Soto we developed stochastic and computational tools to mechanistically simulate sinking particles in the ocean.

Afterwards, I moved forward in the knowledge of the Biological Pump and its accurate quantification. On one hand we developed an innovative method to evaluate particle sinking velocities based on radionuclide disequilibrium, on the other hand, we applied the stochastic simulation to the interpretation of ²³⁴Th results according to sampling and bloom moment. On a second topic, with CNA-US-CSIC, we worked actively on the use of long-life radionuclides (¹²⁹I, Pu, ²³⁶U, using AMS techniques), as tracers of marine water masses, including Lagrangian models of ocean circulation. We make important progresses developing radiometric techniques, defining their biogeochemical models, and defining the circulation of

the Arctic, Pacific and Atlantic Oceans. An additional research line in the field of Geochemistry, is followed in collaboration with the CICCartuja-CSIC, focusing on the analysis of bentonites clays as geological or long-term engineering barriers of nuclear wastes.

In the present, I lead the research line Radioactive Tracers in the Ocean. In the last five years, I have led three projects related with the biological pump (2 J. Andalucía and 1 MSCA funded), focusing on the evaluation of particle sinking velocity using radioactive pairs and particle imaging techniques. Furthermore expanding the compilation of ^{234}Th - ^{238}U data to evaluate carbon export and transfer efficiencies, publishing the most comprehensive ^{234}Th compilation ever prepared.

Projects and Collaborations:

Invited researcher at National Oceanography Centre, UK (August-October 2011), Lamont-Doherty Earth Observatory. Columbia University, USA (July- September 2014)), Harbin Institute of Technology, China (February 2017), ETH-Zürich (July-August 2017) and WHOI, USA (April 2022).

Participation in sampling cruises: 2006 (Canarias, BO Hespérides), 2009 (Porcupine Abyssal plain, RSS Discovery, UK), 2010 (Irminger and Iceland basin, RSS Discovery, UK) and 2012 (RSS James Cook, UK). Programmed cruise: APERO June 2023 (PAP site, France)

Principal Investigator: 3 EU projects. 1 MINECO Europa Centros Tecnológicos. 2 FEDER-Junta Andalucía. 1 Coordinated Research Project with IAEA-UN (ONU). 3 68/83 LOU. 1 FPI contract. 1 Junta de Andalucía student contract.

Researcher in the last 10 years in 16 projects funded by: European Commission, MICINN, J Andalucía, NERC, CNRS, U Sevilla Research Funds. Researcher in 68/83 LOU projects, 6.

Present collaboration in 5 international projects: COMICS (UK, IP R.Sanders), CUSTARD (UK, IP A. Martin), EXPORTS (USA, IP D. Siegel), SOLACE (Australia, IP P. Boyd) and APERO (France, IP L.Memery).

Scientific expert for the Technical Cooperation Department of the International Atomic Energy Agency (United Nations), lecturing internationally and on training assignments at IAEA.

>75 contributions to **international congresses**. **Guest editor** *Deep-Sea Research II: COMICS I* special issue **Reviewer of >60 papers JCR**. **Chairwoman and Session organiser** Ocean Science Meeting 2018. JETZON town hall Ocean Science meeting 2020 **Participation in International networks**: JETZON (Joint Exploration of the Twilight Zone Ocean Network), UN Ocean Decade Programme, GEOTRACES and Spanish GEOTRAC-ES.

Reviewer and evaluator: Agencia Española Investigación (AEI) from 2019. **R+D+i** projects in nuclear waste management and nuclear power plants from public and private fundings. **European Commission (Erasmus + , H2020-FET, Horizon Europe)**, 2018-present

Academic merits and supervision of degree and master students: 5 PhD thesis (3 finalized, 2 in development), **5 MSc** and **5 Ba** final projects. **5 Empleo Joven contracts** Junta de Andalucía. **Reviewer** Posdoctoral grants German **DAAD** 2016 - present.

Academic Positions: Director International Project Office Universidad de Sevilla (20/04/16 – 28/02/21) -- Coordinator of Network European Projects CRUE University Association (01/11/19 – 01/04/21) -- Erasmus Mobility coordinator. B. Engineering (2013-2014), Posgraduate (2015-2016) schools -- Vice-Dean International Graduate School Universidad de Sevilla (15/02/15 – 20/04/16) -- Vice-Dean for Internationalization. ETS Building Engineering (15/11/13 - 14/02/15) -- Vocal of Network in European Projects for CRUE (01/03/17 - 31/10/19)

- 59 papers in JCR-SJR indexed journals (39 in Q1 & 18 in D1 journals) & 10 book chapters.
- 3 sexenios 2001/2006, 2007/2012 and 2013/2018

Dissemination: Regular collaboration with the Scientific Culture Unit (UCCi) of the University of Sevilla. Publication of 2 articles for El País, 1 for ABC and 1 for FORBES.

Part C. RELEVANT MERITS (sorted by typology) **ORCID 0000-0001-7157-8588**

C.1. Publications (10 Selected Publications related to the topic)

1. Ceballos-Romero, E., Buesseler, K.O., Villa-Alfageme, M., 2022 *Revisiting five decades of ²³⁴Th data: a comprehensive global oceanic compilation*. **Earth Syst. Sci. Data** **14**
2. Hurtado-Bermúdez, S. and Villa-Alfageme, M.. 2021. *Correlation of phytoplankton satellite observations and ²¹⁰Po radiological doses in molluscs*, **Mar. Pollut. Bull.**, **172**
3. Martin, A. et al., 2020. *The oceans' twilight zone must be studied now, before it is too late*. **Nature**, **580**: **26-28**.
4. Wiedmann, I., Ceballos-Romero, E., Villa-Alfageme, M., Renner, A., Dybwad, C., van der Jagt, H., Svensen, C., Assmy, P., Tatarek, A., Rózanska-Pluta, M., Iversen, M., H. 2020. *Arctic Observations Identify Phytoplankton Community Composition as Driver of Particle Sinking Velocity and Carbon Flux Attenuation*. **Geophysical Research Letters**, **47**
5. Ceballos-Romero, E., de Soto, F., Le Moigne, F., García-Tenorio, R., Villa-Alfageme, M., 2018. *²³⁴Th-derived particle fluxes and seasonal variability: when is the SS assumption reliable? Insights from a novel approach for carbon flux simulation*. **Geophysical Research Letters**, **45**: **13414**.
6. de Soto, F., Ceballos-Romero, E., Villa-Alfageme, M., 2018. *A stochastic model for particle flux attenuation in ocean waters: application to radioactive pairs disequilibria*. **Cosmochimica et Geochimica Acta**, **239**: **136-158**.
7. Ceballos-Romero, E., Le Moigne, F.A.C., Henson, S., Marsay, C.M., Sanders, R.J., García-Tenorio, R., Villa-Alfageme, M., 2016. *Influence of bloom dynamics on Particle Export Efficiency in the North Atlantic: a comparative study of radioanalytical techniques and sediment traps*. **Mar. Chem.** **186**, **198–210**.
8. Villa-Alfageme, M., de Soto, F.C., Ceballos, E., Giering, S.L.C., Le Moigne, F.A.C., Henson, S., Mas, J.L., Sanders, R.J., 2016. *Geographical, seasonal, and depth variation in sinking particle speeds in the North Atlantic*. **Geophys. Res. Lett.** **43**.
9. Villa-Alfageme, M., Mas, J.L., Hurtado-Bermudez, S., Masqué, P., 2016. *Rapid determination of ²¹⁰Pb and ²¹⁰Po in water and application to marine samples*. **Talanta** **160**.
10. Villa-Alfageme, M., De Soto, F., Le Moigne, F.A.C., Giering, S.L.C., Sanders, R., García-Tenorio, R., 2014. *Observations and modeling of slow-sinking particles in the twilight zone*. **Global Biogeochem. Cycles** **28**.
11. Le Moigne, F.A.C., Villa-Alfageme, M., Sanders, R.J., Marsay, C., Henson, S., García-Tenorio, R., 2013. *Export of organic carbon and biominerals derived from ²³⁴Th and ²¹⁰Po at the Porcupine Abyssal Plain*. **Deep. Res. Part I Oceanogr. Res.** **72**, **88–101**.

C.2. Congresses full list in https://investigacion.us.es/sisius/sis_showpub.php?idpers=4783

- Villa-Alfageme, M., Muñoz-Nevado, C., Hurtado-Bermúdez, S.J., 2022. *Compilation of sinking velocities in the Atlantic Ocean from ²³⁴Th-²³⁸U and ²¹⁰Po-²¹⁰Pb profiles*, in: Ocean Science Meeting. 2022. pp. 28 February– March.
- Villa-Alfageme, M., Ceballos-Romero, E., Giering, S.L.C., de Soto, F.C., 2019. *Particle Sinking Velocities distribution from the Arctic to the Southern Ocean: Patterns and implications*, in: IMBER Open Science Conference. Future Oceans 2 Brest, France, June.
- Villa-Alfageme, M., Ceballos-Romero, E., de Soto, F., Giering, S.L.C., Le Moigne, F.A.C., Henson, S., Soto, Feliciano de, Moigne, F. Le, Giering, S.L.C., Henson, S., Ceballos, E., Le Moigne, F.A.C., Henson, S., Sanders, R., 2018. *Influence of Particle Sinking Velocities on Carbon Flux Attenuation and Export Efficiency*, in: Ocean Sciences Meeting 2018. Portland. AGU, Portland, USA. 14-20 February.
- Villa-Alfageme, M., Ceballos-Romero, E., de Soto, F., 2016. *New approaches on the evaluation of carbon export fluxes and their attenuation rates. The Biological Carbon Pump in a Changing World*. Euromarine Foresight Symposium. Bremen, Alemania. 15-20 October.

C.3. Research projects, indicating your personal contribution. (Last 5 years)

Principal Scientist

- **Junta de Andalucía. Convocatoria PAIDI.** *Radioactive tracers and novel modelling techniques for an accurate quantification of the Biological Pump and ocean carbon storage.* TRACECARBON. From: 01/09/2021 to: 31/12/2022. 57 200 €
- **European Commission. MSCA-IF.** Call 2014-2020. *IMaging Ocean Sinkers for evaluating carbon export fluxes.* Coordinator. From: 01/09/2021 to: 31/08/24. 245 732 €.
- **Junta de Andalucía. FEDER.** Call 2014-2020. *AMS and radiometrically determined radionuclides as tracers of natural processes in the Arctic and Southern Oceans.* From: 01/02/2020 to: 31/01/2022. 80 000 €.

- **European Commission.** Horizon Europe Funds – *Collaborative Doctoral Partnerships with Joint Research Centre. Synthesis and characterization of the tailor-made clays with enhanced properties.* From: 01/09/2020 to 31/08/2025.
- **IAEA (United Nations).** *Anthropogenic ²³⁶U, ¹²⁹I and natural ²¹⁰Po, ²³⁴Th radionuclides as tracers of Oceanography studies* in the coordinated Research Project: *Behaviour and Effects of Natural and Anthropogenic Radionuclides in the Marine Environment and their use as Tracers for Oceanography Studies.* From: 01/06/2017 to: 31/05/2021.
- **Swiss National Science Foundation:** *Improving our knowledge of U-236 as an oceanographic tracer by the measurement of Irish Sea sediments.* Project to be developed at ETH-Zürich. From: 01/07/2017 to: 31/08/2017. 7 000 CHF
- **MINECO.** Ministerio de Economía, Industria y Competitividad. Convocatoria Europa Centros Tecnológicos. *Fortalecimiento de la Oficina General de Proyectos Internacionales de la Universidad de Sevilla (FOGPIUS) ECT– 2017-0289.* 2017 - 2018. from: 01/01/2016 to: 31/12/2018. 65 446,08 €
- **V Plan US Research Funds.** *Contratos Predoctorales/PIF, para el Desarrollo del Programa Propio I+D+i de la US.* 2016 - 2019. 78 000 €
- **European Commission.** Capacity Building Actions K2. *Professional Bachelor and Master curricula for the energy performance in building industry in Russia, China and Azerbaijan* LPMB561732-EPP-1-2015-1-FR-EPPKA2-CBHE-JP. 01/10/2015 - 31/09/2018, 42 849 €

Researcher

- COordination and iMplementation of a pan-European instrumenT for radioecology-COMET-604974 FP7-Fission-20. Entidad financiadora: **EC, 7º Framework Program** Institutions: USE, ETH-Zürich, Woods Hole-MIT. Coordinated by SCK-CEN (Belgium). From 15/10/2014 to 31/05/2017. 159246 €. IP: R. García-Tenorio. Participants en US: 10
- **APER0.** Entidad financiadora: **ANR-Francia.** From 01/09/2022 to 31/08/2024. IP: Laurent Memery, Christian Tamburini, Lionel Guidi (*LEMAR-MIO-LOV – CNRS*).
- Buscando los Limites en Espectrometría Masas con Acelerador de Baja Energía (Leams) en el Centro Nacional de Aceleradores (CNA): Métodos y Aplicaciones. **MICINN.** Universidad de Sevilla, ETH-Zürich, Columbia University, USA, IAEA- ONU. From 01/01/2019 to: 31/06/2021. 130000 €. IP: JM López Gutierrez - R. García-Tenorio. Participants 9.
- Resolución de problemas ambientales marinos y terrestres clave mediante nuevos desarrollos en espectrometría de masas con acelerador de baja energía (LEAMS) en el CNA: **MINECO.** Universidad de Sevilla, ETH-Zürich, National Oceanographic Center, UK. 01/01/2016 - 31/12/2018. 117000 € IP: JM López Gutierrez - R García-Tenorio. Participip. 15.

C.4. Contracts, transference and technology activities

- **Principal Scientist. Contract type:** Proyecto 68/83. Evaluator I+D+I projects for DNV–GL auditors. From 2018 to 2021. 3 contracts 68/83 9 000 €
- **Principal Scientist.** Contract type: Garantía Juvenil-Empleo Joven. 3 contracts from 01/06/2017-30/06/2018. 2 contracts from 01/01/2018 – 30/06/2019
- **Principal Scientist.** Contract type: INVESTIGO. 1 contracts from 01/03/2023-28/02/2025.

Researcher:

- Contract type: 68/83. Análisis Comparativo De La Retención De Cesio E Iodo Por Barreras Reactivas De Arcillas: Escala Prepiloto. 0079000237. Funding institution: Empresa Nacional De Residuos Radiactivos, S.A. (ENRESA). 2015-2016. IP: M. A. Castro. 300.000,00 €
- Contract type: 68/83. Caracterización De Mecanismos De Retención De Actínidos En Micas Sintéticas: Aplicación A La Retención De Cesio Y Yodo. C0079000121- Funding institution: Empresa Nacional De Residuos Radiactivos, S.A. (ENRESA). 2011-2013. IP: M. A. Castro Arroyo (US). 113.575,00 €
- Contract type: 68/83. Programa De Vigilancia Radiologica Ambiental Funding institution: Consejo de Seguridad Nuclear. From: 01/01/1999 to: 19/04/2013. IP: Guillermo Manjon. 54.458,00€ (yearly).
- Contract type: 68/83. Plan De Vigilancia Radiológica Ambiental Independiente De Las Instalaciones De El Cabril Y La Fábrica De Uranio De Andujar. Funding institution: Consejo de Seguridad Nuclear. 01/01/2002 to: 19/04/2008. IP: R. García-Tenorio. 10.000,00€ (yearly).