

Part A. PERSONAL INFORMATION

CV date

05/09/2019

First and Family name	MARÍA VILLA ALFAGEME		
Social Security, Passport, ID number	28755619F	Age	42
Researcher numbers	Researcher ID	K-6700-2013	
	Orcid code	0000-0001-7157-8588	

A.1. Current position

Name of University/Institution	UNIVERSIDAD DE SEVILLA		
Department	DPTO. FÍSICA APLICADA II		
Address and Country	AVDA. REINA MERCEDES, 4A		
Phone number	637422366	E-mail	mvilla@us.es
Current position	Prof. Titular – Associate Professor	From	20/12/2016
Espec. cód. UNESCO	2301.16, 2503.04, 2503.09, 2510.02, 3308.05, 3320.01, 3320.02		
Palabras clave	Environmental radiochemistry, geochemistry, marine biogeochemistry, radioactivity, ionizing radiations, uranium, ^{210}Po , ^{210}Pb , ^{234}Th , ^{236}U , ^{238}U , ^{129}I , nuclear waste management, GEOTRACES, ocean biological pump and carbon export		

A.2. Education

PhD	University	Year
Degree in Physic (Lcdo)	Universidad de Sevilla	1999
Msc. in Physics Education	Universidad de Sevilla	2001
PhD in Physics	Universidad de Sevilla	2004

A.3. JCR articles, h Index, thesis supervised

- In the last 10 years: **2 PhD thesis supervised** (Cerenkov radiation by LSC & ^{210}Po and ^{234}Th as tracers in the ocean). Presently **supervising 1 PhD thesis** (^{90}Sr by LSC)
- **47 papers** in JCR-SJR indexed journals (**40 in Q1 & 10 in D1 journals**). 1 under revision
- **702 total citations** -- **476 from 2014** (Gloogle Scholar).
- The average **citations/year is 84 in the last 5 years**
- **Impact factor h = 16 ; h= 13 from 2014**
- **Three sexenios** 2001/2006, 2007/2012 and 2013/2018

Part B. CV SUMMARY (max. 3500 characters, including spaces)

I performed my **PhD in Applied Nuclear Physics** in the development of low level counting techniques for radioactivity counting (α -spectrometry, LSC, beta counting) and development of radiochemical techniques. During my PhD I worked in a complementary research field in Geochemistry, based on the use of radionuclides as tracers of environmental processes, specially, natural isotopes, e.g. NORM (Naturally Occurring Radioactive Materials) waste analyses.

I fulfilled my **postdoc** in Institut de Ciencia y Tecnologia Ambientals, **Universidad Autónoma de Barcelona (postdoctoral Grant MINECO-MICINN-Fulbright)** working in the *use of radioactive pairs ^{234}Th - ^{238}U y ^{210}Po - ^{210}Pb to estimate ocean carbon export*. In a first stage I specialized in radiochemical methodologies and techniques of measurement of these pairs.

With this new open field, back at the U Sevilla I opened the research line in the Applied Nuclear Physics group based on the use of radioactive tracers in the ocean. In close -and on-going- collaboration with **National Oceanography Centre (NOC), UK** we are *moving forward in the knowledge of the biological carbon pump and its accurate quantification*. Furthermore, in collaboration with Dpto. Sistemas Físicos, Químicos y Naturales (**Universidad Pablo de Olavide**), *novel computational tools have been developed to simulate sinking particles in the ocean*.

I work actively on a second research line about *the use of long-life radionuclides (^{129}I , Pu , ^{236}U), measured using AMS techniques, as tracers of marine water masses and sediments*. **The Applied Nuclear Physics Group at Accelerator National Centre (CNA)**, Radioisotope Service (US) and ETH-Zürich form a multidisciplinary group that has make important progresses in radiometric techniques and defining the present unknowns in relation to radionuclides released at sea, to be solved in a near future.

Finally, my third research line at present is in the field of Geochemistry in collaboration with the **Group of Chemistry of Solid State of US**, in the *analysis of bentonites clays as geological or long term engineering barriers of nuclear wastes*.

I had participated in the following **sampling cruises**: 2006 (Canarias, BO Hespérides, RODA MINECO project), 2009 (Porcupine Abyssal plain, RSS Discovery, UK, Oceans 2015 project), 2010 (Irminger and Iceland basin, RSS Discovery, UK, IBIS project) and 2012 (RSS James Cook, UK, EURO-BASINS project). I was organizer of the sampling cruise to Scotia Sea (Southern Ocean) for the measurement of ^{234}Th y ^{210}Po with British Antarctic Survey. Also organizer of ^{210}Po for two sampling cruises in Southern Ocean and Benguela, for COMICS project from NOC.

Invited researcher at National Oceanography Centre, UK (August-September 2011), Lamont-Doherty Earth Observatory, Columbia University, USA (July- September 2014)), Harbin Institute of Technology, China (February 2017) and ETH-Zürich (July-August 2017). Scientific expert for the Technical Cooperation Department of the International Atomic Energy Agency (United Nations), lecturing internationally and on training assignments.

Principal Investigator in: 1 MINECO Europa Centros Tecnológicos. 1 FEDER. 1 EC Erasmus+ K2. 1 EC with Joint Research Centre-Karlsruhe. 1 Coordinated Research Project with IAEA (UN). 1 68/83 LOU. 6 US Research Funds. 1 PIF contract. 5 contracts Empleo Joven.

Researcher in the last 10 years in 14 projects funded by European Commission, Spanish MINECO, Regional Funds and from US Research Funds. Researcher in 6 68/83 LOU projects. And in 1 international project: COMICS (UK, IP Sanders).

Part C. RELEVANT MERITS

C.1. Publications (In the last 5 years)

- Villa-Alfageme, M., Chamizo, E., López-Lora, M., Kenna, T., Casacuberta, N., Masqué, M., Christl, M., *Distribution of ^{236}U in the U.S. GEOTRACES Eastern Pacific Zonal Transect and its use as a water mass tracer*, Chemical Geology, **517**, 44-57
- Rivera-Silva, J., Hurtado-Bermúdez, S., Villa-Alfageme, M., Manjón, G., *Comparison and validation of methods for the determination of ^{90}Sr by Cerenkov counting in biological and sediment samples, including green chemistry metrics*, Journal of Radioanalytical and Nuclear Chemistry, 2018 **1-14**
- de Soto, F., E. Ceballos-Romero, and M. Villa-Alfageme, *A stochastic model for particle flux attenuation in ocean waters: application to radioactive pairs disequilibria*, Cosmochimica et Geochimica Acta, 2018, **239**, 136-158
- Ceballos-Romero, E., F. de Soto, F. Le Moigne, R. García-Tenorio, and M. Villa-Alfageme, *Implications of the steady state assumption for POC export evaluation*, Geophysical Research Letters, 2018, **Accepted**
- Vivo, C., J.M. López-Gutierrez, R. Periañez, F. Le Moigne, C. Marcinko, McGinnity, and M. Villa-Alfageme, *Recent evolution of ^{129}I levels in the Arctic and North Atlantic Oceans*, Science of the total Environment, 2018, **621**, 376-386
- Villa-Alfageme, M., E. Chamizo, F.J. Santos-Arevalo, J.M. López-Gutierrez, I. Gómez-Martínez, and S. Hurtado, *Natural and artificial radionuclides in a marine core. First results of ^{236}U in North Atlantic Ocean sediments*, Journal of environmental Radioactivity, 2018, **186**: p. 152-160.
- Schlitzer, R., et al., *The GEOTRACES Intermediate Data Product 2017*, Chemical Geology, 2018, **493**, 210-223
- Periáñez, R., K.-S. Suh, B.-I. Min, and M. Villa-Alfageme, *The behaviour of ^{236}U in the North Atlantic Ocean assessed from numerical modelling: A new evaluation of the input function into the Arctic*, Science of The Total Environment, 2018, **626**: p. 255-263.
- López-Lora, M., E. Chamizo, M. Villa-Alfageme, S. Hurtado-Bermúdez, N. Casacuberta, and M. García-León, *Isolation of ^{236}U and $^{239,240}\text{Pu}$ from seawater samples and its determination by Accelerator Mass Spectrometry*, Talanta, 2018, **178**: p. 202-210.
- Hurtado, S., M. Villa-Alfageme, J.L. Mas, and M.D. Alba, *Characterization of high-level radioactive waste containing uranium using solvent extraction and extraction chromatography resin techniques*, Applied Radiation and Isotopes, 2018, **137**, 177-183
- Hurtado-Bermudez, S., J.L. Mas, and M. Villa-Alfageme, *A sequential determination of ^{90}Sr and ^{210}Po in food samples*, Food Chemistry, 2017, **229**, 159-164
- Villa-Alfageme, M., J.L. Mas, S. Hurtado-Bermudez, and P. Masqué, *Rapid determination of ^{210}Pb and ^{210}Po in water and application to marine samples*, Talanta, 2016, **160**: p. 28-35.
- Villa-Alfageme, M., F.C. de Soto, E. Ceballos, S.L.C. Giering, F.A.C. Le Moigne, S. Henson, J.L. Mas, and R.J. Sanders, *Geographical, seasonal, and depth variation in sinking particle speeds in the North Atlantic*, Geophysical Research Letters, 2016, **43**(16): p. 8609-8616.

14. Ceballos-Romero, E., F. Le Moigne, S. Henson, C. Marsay, R. Sanders, R. García Tenorio, M. Villa-Alfageme, *Influence of bloom dynamics on particle export efficiency in the N Atlantic: a comparative study of radioanalytical tech and sediment traps*. Mar. Chem., 2016. **186**:198-210.
15. Villa-Alfageme, M., J.M. López-Gutiérrez, S. Kyung-Suk, M. Byung-Il, and R. Periañez, *The behaviour of 129I released from nuclear fuel reprocessing factories in the North Atlantic Ocean and transport to the Arctic assessed from numerical modelling*. Mar. Polut. Bul. 2015. **90**: p. 15-24.
16. Villa-Alfageme, M., S. Hurtado, S. El Mrabet, M.C. Pazos, M.A. Castro, and M.D. Alba, *Uranium immobilization by FEBEX bentonite and steel repositories. Structural analysis and quantification*. Chemical Engineering Journal, 2015. **269**: p. 279-287.
17. Chamizo, E., M. López-Lora, M. Villa, N. Casacuberta, J.M. López-Gutiérrez, and M.K. Pham, *Analysis of 236U and plutonium isotopes, 239,240Pu, on the 1 MV AMS system at the Centro Nacional de Aceleradores, as a potential tool in oceanography*. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials & Atoms, 2015. **361**: p. 535-540.
18. Villa-Alfageme, M., S. Hurtado, M.D. Alba, M.A. Castro, S. El Mrabet. *Quantification and comparison of the reaction properties of FEBEX and MX-80 clays with saponite, as immobilizers of europium under subcritical conditions*. Applied Clay Science, 2014. **101**: p. 10-15.
19. Villa-Alfageme, M., F. de Soto, F.A.C. Le Moigne, S. Giering, M. Salvador, and R. Sanders, *Observations and modeling of slow sinking particles in the Twilight zone*. Global Biogeochemical Cycles, 2014. **28**(11): p. 1327-1342.
20. Le Moigne, F.A.C., A.M. Moore, R.J. Sanders, M. Villa-Alfageme, S. Steimberg, and E. Achtemberg, *Sequestration efficiency in the iron-limited North Atlantic: Implications for iron supply mode to fertilized blooms*. Geophysical Research Letters, 2014. **41**(13): p. 4619-4627.
21. El Mrabet, S., M.A. Castro, S. Hurtado, M.M. Orta, M.C. Pazos, M. Villa-Alfageme, and M.D. Alba, *Effect of the clay and the metal container in retaining Sm³⁺ and ZrO₂⁺ and the reversibility of the process*. American Mineralogist, 2014. **99**(4): p. 696-703.
22. El Mrabet, S., M.A. Castro, S. Hurtado, M.M. Orta, M.C. Pazos, M. Villa-Alfageme, and M.D. Alba, *Competitive effect of metallic canister and clay barrier on the sorption of Eu³⁺ under subcritical conditions*. Applied geochemistry, 2014. **40**: p. 25-31.

C.2. Research projects and grants

Principal Scientist

- **FEDER funds**. Convocatoria 2014-2020 Junta de Andalucía. *AMS and radiometrically determined radionuclides as tracers of natural processes in the Arctic and Southern Oceans*. From: 01/10/2019 to: 31/09/2021. 80 000 €.
- **European Commission**. Collaborative Doctoral Partnerships with Joint Research Centre – Pilot Project Horizon Europe. *Synthesis and characterization of the tailor-made clays with enhanced properties* 2018. Co-PI M^a Dolores Alba from ICM-CSIC. Signing Grant Agreement.
- **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 with N. Casacuberta. 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. from: 01/10/2015 to: 31/09/2018 42.849,00 €
- **V Plan US Research Funds**. Acción Internacionalización. *Applications of use of anthropogenic radionuclides to trace North Atlantic and Arctic Ocean water masses*. 2015. 2000€
- **V Plan US Research Funds**. Acción Especial. *Procesos clave en la retención y exporte de carbono en los océanos mediante la medida de pares radiactivos*. Campaña Antártica. 2013. 2500€

Researcher

- COordination and iMplementation of a pan-European instrument for radioecology-COMET-604974 FP7-Fission-20. Entidad financiadora: **European Comission, 7^o Framework Program** Institutions: Universidad de Sevilla, ETH-Zürich, Woodshole-MIT. Coordinated by SCK-CEN (Belgium). From 15/10/2014 to 31/05/2017. 159246 €. IP: R. García-Tenorio. Participants en US: 10
- Resolución de problemas ambientales marinos y terrestres clave mediante nuevos desarrollos en espectrometría de masas con acelerador de baja energía (LEAMS) en el CNA: **Ministerio de Economía y Competitividad**. Institutions: Universidad de Sevilla, ETH-Zürich, National Oceanographic Center, UK. From 01/01/2016 to: 31/12/2018. Cuantía: 117000. IP: JM López Gutierrez - R. García-Tenorio. Participants 15.
- Espectrometría de masas con aceleradores de baja energías (LEAMS) en el Centro Nacional de Aceleradores (CNA): datación y aplicaciones ambientales. **Ministerio de Economía y Competitividad**. Universidad de Sevilla, ETH-Zürich, National Oceanographic Center, UK. Duration, from: 01/10/2012 to: 01/10/2015. Amount: 122000€. IP: Manuel García León. Participip: 18.
- Inmovilización de Cationes en un Espacio Confinado de Alta Densidad de Carga: Gestión de Residuos Peligrosos. Entidad financiadora: **DGICYT** (CTQ2010-14874/BQU). Duration: 01/12/2011-31/12/2013. 82.284,00 €. IP: María Dolores Alba Carranza (CSIC).
- Aplicación de técnicas de datación por isótopos radiactivos en ecosistemas naturales andaluces. Entidad financiadora: **Junta de Andalucía** (Consejería de Innovación, Ciencia y Empresas). From: 31/08/2008 to: 30/01/2012. 364668 €. IP: Rafael García-Tenorio. Participants: 34.

C.3. Contracts, transference and technology activities

- **Principal Scientist**. Contract type: Proyecto 68/83. Evaluator I+D+I projects for DNV–GL auditors. From 2018.
- **Principal Scientist**. Contract type: Garantía Juvenil-Emploeo Joven. 3 contracts from 01/06/2017-30/06/2018. 2 contracts from 01/01/2018 – 30/06/2019
- Contract type: Proyecto: 68/83. Caracterización De Mecanismos De Retención De Actínidos En Micas Sintética: Aplicación A La Retención De Cesio Y Yodo. C0079000121- Funding institution: Empresa Nacional De Residuos Radiactivos, S.A. (ENRESA). Duration: 2011-2013. IP: M. A. Castro Arroyo (US). 113.575,00 €
- Contract type: 68/83. Análisis Comparativo De La Retención De Cesio E Iodo Por Barreras Reactivas De Arcillas: Escala Prepiloto. Code 0079000237. Funding institution: Empresa Nacional De Residuos Radiactivos, S.A. (ENRESA). Duration: 2015-2016. IP: M. A. Castro Arroyo. 300.000,00 €
- Contract type: 68/83. Programa De Vigilancia Radiológica Ambiental Funding institution: Consejo de Seguridad Nuclear. From: 01/01/1999 to: 19/04/2013. IP: Guillermo Manjon Collado. 54.458,00€ (yearly renewed).
- 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. from: 01/01/2002 to: 19/04/2008. IP: Rafael García-Tenorio. 10.000,00€ (yearly renewed).

C.5. Participation en committees and international representation

1. 78 contributions to International congresses. 2. Guest editor *Deep-Sea Research II*: COMICS South Georgia special issue 3. Reviewer in JCR: *DSRII*, Applied Radiation and Isotopes, Radiation Measurements, Geochemica and Cosmochimica Acta, Radiation Meas, Environmental Pollution, Marine Pollution Bulletin, Nuclear Instruments and Methods A., PLOS, Radiation Protection Dosimetry, Science of the Total Environment, Radiation Physics and Chemistry, Chemosphere, Biogeoscience, J Geochemical Exploration etc 5. Chairwoman and Session organiser Ocean Science Meeting 2018.

C.4. Academic merits and Supervision of degree and master projects

2 MSc supervisión in University of Sevilla (2014) and **2 Degree projects** in U Pablo Olavide (2010 y 2011). **3 Evaluation Board Member** of Posdoctoral grants German **DAAD** 2016 - present. **4 Director Erasmus Mobility** in School of Building Engineering and Posgraduate School 2013- 2016.

C.6. Institutional Experience (Last 5 years)

- Director International Project Office Universidad de Sevilla (20/04/16 – Present)
- 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 European Projects in Conferencia de Rectores de Univ. Españolas **CRUE**. Feb 2017